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# THE LARYNGOSCOPE

AN INTERNATIONAL MONTHLY JOURNAL
DEVOTED TO DISEASES OF THE

# EAR - NOSE - THROAT

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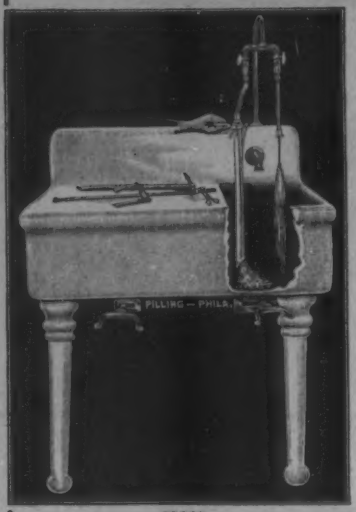


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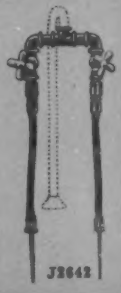

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THE

# LARYNGOSCOPE.

VOL. XL. AUGUST, 1930. No. 8

## ORIGINAL COMMUNICATIONS.

(Original Communications are received with the understanding that they are contributed exclusively to THE LARYNGOSCOPE.)

### COLOR MOVIES OF VOCAL CORD ACTION— AN AID IN DIAGNOSIS.

G. OSCAR RUSSELL, PH.D.,
Director, Speech Clinic,
Ohio State University.

C. H. TUTTLE,
Research Engineer, Physics Dept.,
Eastman Laboratories.

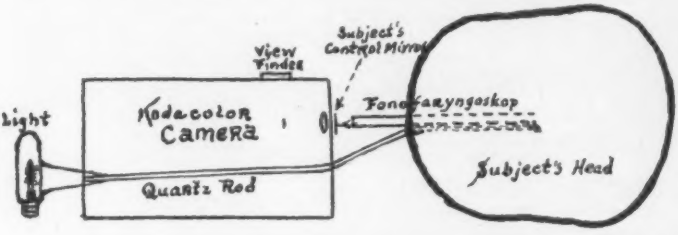
Ever since the early still photographs of the vocal cords obtained by French were first published, repeated attempts have been made to duplicate the feat in moving pictures. Some of these have been partially successful. The most noteworthy were those of Calzia and Hegner. The principal difficulty lay in obtaining enough light to register the extremely rapid action of even the superior muscles of the interior larynx.

Then, too, certain pathological conditions made it seem desirable to obtain colored motion pictures. Calzia had been successful in getting a few colored still photographs. These showed clearly that much could be learned in regard to disturbing conditions of the interior larynx from such a record.

Where the paralysis of certain intrinsic muscles was involved by reason of this pathological condition, it became very apparent that colored motion pictures might add very considerable information which would serve to guide the diagnosis and treatment of the laryngologist. It is a well known fact that the rapidity of movement in fine muscles such as those here involved makes first-hand visual observation very unsatisfactory. This is especially true where the observation has to be made through an ordinary laryngoscope, which

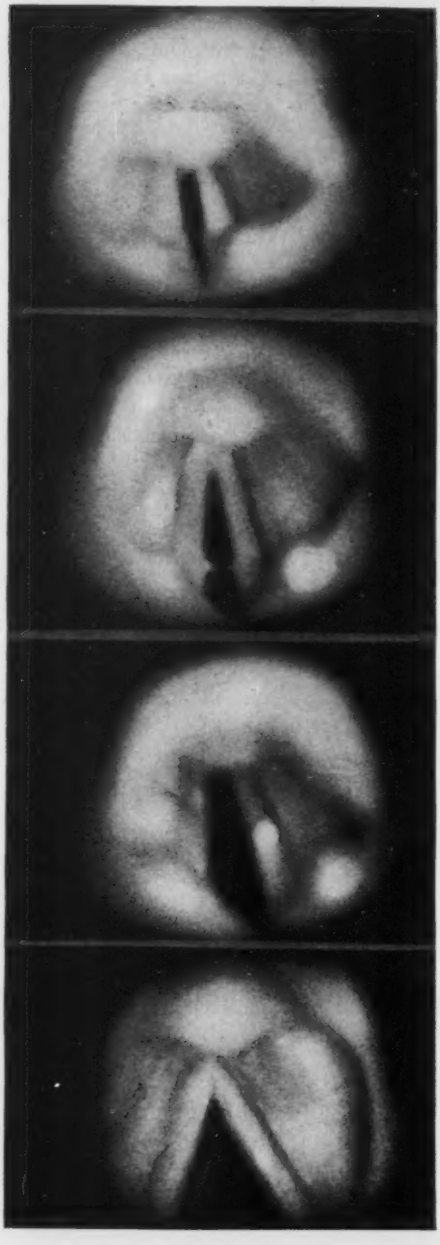
gives at best a very fleeting view and one which is sharply limited by reason of the subject's inability to speak normally.

With the development of the author's (Russell) fonofaryngoskop, manufactured by the Electro-Surgical Instrument Company, Rochester, N. Y., this latter observation is eliminated and means provided whereby sufficient light could be passed into the interior larynx to justify the thought that such colored motion pictures might be obtained. The first attempt was undertaken something over two years ago. A subsidy from the Carnegie Foundation, an active interest on the part of Dr. Merriam, of the Carnegie Institution at Washington, and Dr. L. A. Jones, of the Eastman Laboratories, made it possible to carry on this work. The General Electric Company likewise co-operated very freely in making up a special lighting system which required considerable preliminary experimentation.




We had the advantage of previous attempts undertaken with success at Ohio State University, some six years ago by one of us (Russell) to photograph the vocal cords during normal speech and voice phonation without impeding in any manner the normal movements of the tongue, epiglottis and other voice organs. These were published in "The Vowel" (O.S.U. Press). As the first of such photographs which had been successfully obtained, they proved conclusively that the laryngologist might expect certain movements of the interior larynx which the simple laryngoscope in current use had never revealed, indeed prevented, and which direct laryngoscopy would evidently inhibit. The wide opening of the front buccal cavity, formerly necessary for such purpose, was no longer required through usage of the fonofaryngoskop, and at the same time sufficient light could be passed in to make a clear and rapid image possible.

Many times more light would evidently be required for moving pictures than for still photographs. The still exposure could be and was prolonged as long as breath was present to produce that voiced



element running as long as 11 seconds in some cases. But now at least 16 exposures per second were required.

The best color process available was the kodacolor, which produces, as is well known, a black on white negative but when projected shows a very faithful color reproduction. That makes it impossible, however, to publish with this article the actual color photographs, since the negative shows black on white. The projection, nevertheless, shows up quite brilliantly. This fact was demonstrated for the otolaryngologists of Johns Hopkins University and Dr. Streeter and his staff of the embryological laboratories in a demonstration some time ago at Baltimore.

The obtaining of colored movies was likewise complicated by reason of the necessity for greatly increased illumination. The kodacolor process calls for some 30 times as much light as would be necessary in ordinary black on white.

The value of such movies for diagnostic purposes need not be elaborated. This is especially true: where the subject's speech can be kept normal; where it is not necessary to bring any force to bear even on the tongue or epiglottis, such as is necessary in direct laryngoscopy; where all vocal organs are free to move; and where partial or complete paralysis of the varying interior laryngeal muscles will therefore show clearly, by reason of their unhampered function. The obtaining of such photographs in color is vital principally because of the evident pathological differentiation which color differences manifest.

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# A NEW OPERATION FOR CHRONIC PURULENT MASTOIDITIS.*

DR. J. MORRISSET SMITH, New York.

This procedure is a new method of performing the radical and might well be termed A New Radical Mastoid Operation. It differs entirely from the average modified radical. In those cases the ossicles and remnants of the tympanic ring and drum are allowed to remain in position. In this new operation the middle ear, Eustachian tube, attic, antrum and mastoid are thoroughly exenterated, as in the radical operation. This is accomplished, however, without, removing the posterior bony canal wall which separates the middle ear from the mastoid cavity, thereby permitting the posterior wound to fill in with solid, healthy granulation tissue as in the simple mastoid operation. Epidermatization of the middle ear is then obtained so that the end-result is similar to an unoperated, healed O.M.P.C. This avoids the postoperative radical cavity and flap and the long-continued after-treatment necessitated by the radical mastoid operation.

It cannot be employed in all cases of chronic purulent mastoiditis. There will always be a small number of cases where the extensive necrosis, symptoms of an intracranial extension of the infection, or a small external auditory canal will require a complete radical operation. It is believed, however, that by the proper selective use it may be employed in fully three-fourths of the cases upon which a complete radical operation has been performed in the past.

The technique is essentially the same as that described in the original article on this operation, printed in the *Medical Journal and Record* for April 3, 1929.

*Technique:* The usual simple mastoid incision is made, starting over the center of the mastoid tip and following the normal curve of the external ear one-quarter to one-half inch behind its attachment. The incision extends upward just above the temporal ridge. The cortex is exposed with the spine of Henle, the temporal ridge and mastoid tip in full view. The bone is removed just below the temporal ridge and behind the spine of Henle until the mastoid antrum is opened. The posterior canal wall is not lowered unless it

*Read before the New York Academy of Medicine, Section on Otology, March 14, 1930.

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be necessary to remove the outer part to avoid a far forward lateral sinus. All of the granulations and diseased bone are removed from the antrum and mastoid cavity, as in the simple mastoid operation. In the average chronic case there are few, if any, mastoid cells present; however, the cavity is cleansed to healthy plate or bone, regardless of the extent.

The aditus is now enlarged by removing a small portion of the inner part of the bridge just external to the incus and horizontal semicircular canal. If this opening is made too large it may interfere with the granulations filling in the posterior wound. The remnants of the ossicles may be removed through the aditus. In some instances it may be easier to remove the malleus through the external auditory canal. The posterior half of the membranous canal is then carefully separated from its bony attachment in the external auditory canal and held in place against the anterior canal wall, allowing the anterior membranous attachment to remain intact, if possible. This allows access to the middle ear and attic. Through this opening the granulations and debris are removed from the middle ear.

The annulus tympanicus is then removed and the Eustachian tube thoroughly curetted. This leaves the attic and the bony space extending posteriorly into the aditus to be cared for. Free access may be had to this space in the roof of the middle ear by partially removing the external wall of the attic. This corresponds to the rim of bone furnishing the attachment for the upper part of the annulus tympanicus or the bony rim on each side of the Ravinian fissure. The removal of this bone together with the contents of the middle ear must be carefully performed since the floor of the cavity at the time of the operation is represented by the internal wall of the middle ear. The facial nerve, crossing the inner wall through the Fallopian canal is covered by a very thin layer of bone; pressure on its wall will result in facial paralysis. An accurate knowledge of the anatomy is necessary to avoid the removal of the stapes or injury to the labyrinth. Care must also be taken to leave a firm posterior bony canal wall; necrosis may result if too much of it is removed.

The operation at this point is represented by a clean middle ear, attic, antrum and mastoid cavity with the posterior canal wall in its normal position. The memebranous canal is now restored as nearly as possible to its original position in the external auditory canal and packed in place with vaselin gauze. A cigarette drain is inserted directly into the mastoid antrum behind and the mastoid wound closed above and below with clips.

*After-treatment:* The subsequent mastoid dressings are identical to those following the simple masoid operation. The clips are removed the third day, the wound cleansed and the cigarette drain replaced. It is then dressed every day or every second day until healed. The reaction and discharge following the acute cases are usually absent and clean granulations fill in the bony cavity with complete healing of the wound in three to four weeks. The canal packing is allowed to remain in place three days. It is then removed, the canal and middle ear cleansed and the packing replaced daily for eight to 10 days; after this the packing is discontinued and boric irrigation used three times a day, followed by alcohol drops.

There is a tendency for granulations to form in the middle ear, especially on the bare bone at the bottom of the bridge and external attic wall. They may be removed with a sharp ring curette or a small aural biting forceps after the insertion of a pledget of 10 per cent cocain solution. It is absolutely essential to have the internal wall dermatize without granulation tissue. It is therefore necessary to have the middle ear and mastoid wound free from blood when the original packing is inserted at the close of the operation. Time should also be taken to remove the blood collecting in these cavities following the first three or four dressings. This insures the best hearing results. About six weeks are required for dermatization of the canal and middle ear. Daily dressings are necessary to obtain the best results.

*Advantages:* The decided advantages of this procedure over the radical operation are due to the removal of the diseased contents of the middle ear and attic without disturbing the posterior bony canal wall. Allowing the posterior wall to remain in its normal position avoids the postoperative radical cavity and plastic flap. It is easier to keep the internal wall of the middle ear free from granulations after the operation. The subsequent hearing is largely dependent upon this one factor in any operation requiring the removal of the ossicles. The exenteration of the diseased tissue of the middle ear and mastoid is practically as complete as that following the radical operation with the exception of the removal of the posterior bony canal wall.

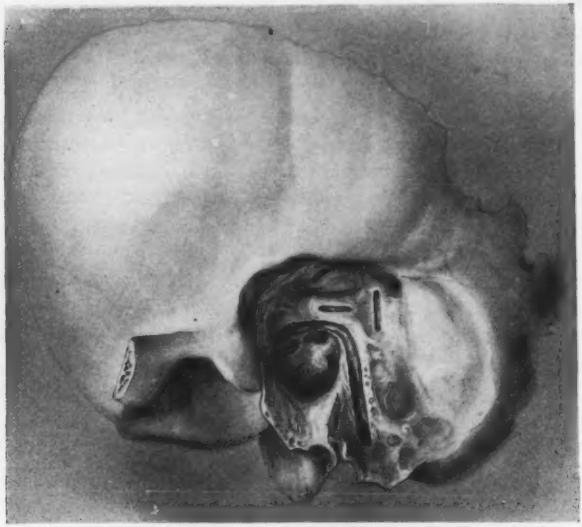
The normal tubular external auditory canal remains to collect and convey the sounds directly to the internal wall of the middle ear. Finally there is the advantage of avoiding the years of after-care and treatment necessitated by the radical operation.

*Contra-indications:* It is contra-indicated when there is an abnormally small and deep external auditory canal, a normal-sized canal is

needed to properly carry out the after-treatment. When there is an unusually far forward sinus, an extensive necrosis of the posterior canal wall, or any symptoms of facial nerve, internal ear or intracranial complications, a complete radical operation should be performed.

CASE PRESENTATIONS.

The four cases presented before this Society* were operated upon at the New York Eye and Ear Infirmary. The hearing tests were all made with a 2-A Western Electric audiometer.



Left temporal bone showing the open canals of the horizontal and vertical course of the facial nerve, three semicircular canals, oval and round windows and the tensor tympani muscle.

*Case 1:* Male, age 30 years, chronic purulent mastoiditis right ear, 10 years' duration. New radical operation, November, 1927. Mastoid healed and middle ear dry five weeks after operation. Hearing by audiometer before operation, 51 per cent. Hearing by audiometer, Jan. 13, 1930, two years and two months after operation, 85.4 per cent. Improvement in hearing after operation, 34.4 per cent.

*Case 2:* Male, age 27 years, chronic purulent mastoiditis with cholesteatoma right ear, nine years' duration. New radical operation,

*Presented before the Otological Section of the New York Academy of Medicine, March 14, 1930.

Aug. 17, 1928. Mastoid healed four weeks, middle ear dermatized and dry six weeks. Hearing by audiometer before operation, 47 per cent. Hearing by audiometer, January, 1930, one year and five months after operation, 65.4 per cent. Improvement in hearing after operation, 18.4 per cent.

*Case 3:* Male, age 26 years, double chronic purulent mastoiditis with cholesteatoma since infancy. *Radical* mastoid operation right ear, June, 1915. Ear dry since operation. Small attic perforation left ear, almost whole drum intact, very foul-smelling discharge. Simple mastoid tried left ear November, 1928. Cholesteatoma found and operation was not successful. New radical operation was performed Dec. 12, 1928. Removed to general hospital during convalescence with rupture duodenal ulcer. When next examined, middle ear was dry with a complete secondary drum membrane present. Secondary drum removed Feb. 21, 1930. Audiometer right ear, 63.3 per cent hearing. Audiometer left ear, Feb. 26, 1930, 77.4 per cent. Note the opportunity presented in this case to compare the results of the two operations. Improvement: 14.4 per cent more hearing in the ear with the new radical operation.

*Case 4:* Male, age 37 years, double chronic purulent mastoiditis, 36 years' duration. New radical operation left ear, Dec. 16, 1929, about three months ago. Mastoid healed five weeks. Ear dermatized and dry five weeks after operation. Hearing by audiometer before operation, 65.6 per cent. Hearing by audiometer, Feb. 25, 1930, two months after operation, 76 per cent. Improvement in hearing after operation, 10 per cent.

*Summary:* Cholesteatoma was found in two of the four cases. Average duration of discharge in the four cases was 19 years. Time elapsed since first operation, two years and two months. Time elapsed since last operation, three months. Average hearing after operation, 76 per cent. Average improvement after operation, 14 per cent.

From the writer's point of view it is not possible to employ any one type of operation in all cases of chronic mastoiditis. It is my custom to let the degree of necrosis in the individual case dictate the type of operation to be employed. I do not hesitate to perform a complete simple, a new radical, or a complete radical operation, depending upon the one I feel will yield the best results.

A thorough knowledge of the technique and anatomy are necessary for the successful employment of this operation. There is always the option of performing a secondary radical mastoid operation when this one is not successful. The postoperative hearing depends to a large extent upon the epidermatization of the internal

wall of the middle ear without granulation tissue. It is therefore important that the annulus tympanicus and part of the external attic wall be thoroughly removed in order to permit the proper after-treatment.

Attention is again called to the fact that this operation is offered as a direct substitute for the radical operation and is intended to be used in those cases requiring a complete exenteration of the middle ear, attic and mastoid cavity. There are two chief requisites of any surgical procedure for chronic purulent mastoiditis. First is the removal of all danger and, second, the conservation of the normal tissues and hearing. I believe this new radical operation offers the best method of achieving these results in a large percentage of the cases.

123 East Fifty-third Street.

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## RARE LABYRINTHIAN DISTURBANCES.

DR. IGNAZ SOMMER, Vienna, Austria,
and
DR. LOUIS SAVITT, CHICAGO.

A normal vestibular nerve when irritated causes a sense of rotatory dizziness, nystagmus, falling and past-pointing. In some rare cases one may observe following irritation of the vestibular nerve, that only part of the above-mentioned symptoms may be present. Nystagmus may appear without the falling sensation and the past-pointing, or the reverse may occur, namely, the falling sensation and past-pointing without nystagmus.

Mrs. E. B. C., age 42 years, first seen in our clinic March 28, 1930. For a period of 10 years she has complained of generalized headaches, occurring daily and of varying duration and intensity, frequent spells of dizziness and severe tinnitus, especially marked on the left side, impaired hearing, and with mild gastric symptoms, such as nausea and vomiting. The dizziness at times would awaken

*From the Otolaryngological Service of the Chicago Eye, Ear, Nose and Throat Hospital.

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her from a sound sleep and during this period she would complain that everything in the room was in motion about her. Her attacks of dizziness appeared suddenly and were associated with marked buzzing in the ears and all objects moving to her right.

*Examination:* The patient's eyes presented normal visual acuity, normal eyegrounds and normal fields. Nose and throat examination, including the larynx, were negative. Neurologic findings as to sensibility, co-ordination and motor power were normal. The right ear was normal. The left ear presented a highly affected inner ear, but with a normal drum. The Weber test lateralizing to the right, the Rinné was positive on the left, and the Schwabach shortened about 40 seconds. The middle and high sounds by air conduction were shortened about 45 seconds. Examination with the audiometer for air conduction showed a hearing loss of 56 per cent on the left, 16 per cent loss on the right, and with the absence of the lowest and highest sounds. No spontaneous nystagmus or falling was noted. When the patient's head was inclined toward the left shoulder an attack of vertigo was present, and a horizontal rotatory nystagmus of first degree was observed bilaterally. Sudden jerking of the patient's head forward and backward brought about similar symptoms. When the caloric test was applied on the right side with 150 c.c. of cold water, nystagmus of the second degree to the left side and with falling and past-pointing to the right was definitely brought about. In the left ear, 300 c.c. of cold water were introduced but failed to produce nystagmus or dizziness, but caused her to fall to the left and to past-point to the same side.

The Galvanic reactions were next observed. Metal electrodes were introduced into the external auditory canals, and we found that when the negative pole was on the right side, and with a current of 15 m.amp., no nystagmus or dizziness occurred.

With the negative pole in the left ear and with a current of 5 m.amp., rotatory nystagmus of a first degree and a rotatory dizziness to the left were noted. A further laboratory examination, which included examination of the urine, blood count, blood Wassermann and spinal fluid, was negative.

On March 30, two days later, our subject was observed during an attack of dizziness. Examination failed to reveal any spontaneous nystagmus, but spontaneous falling to the left was seen, which depended on the position of the head. Again the caloric test with 300 c.c. of cold water introduced into the left ear did not produce nystagmus and no past-pointing, but spontaneous falling persisted.

Unipolar galvanic reactions were next observed. On the right ear

with a current of 10 m.amp., anode contraction was stronger than the anode closing, while the cathode closing was stronger than the cathode opening. On the left ear with a current strength of 5 m.amp., anode opening was stronger than the cathode closing and the cathode closure was stronger than the cathode opening.

On April 3, the patient was again observed during one of her spells of dizziness, with spontaneous nystagmus of first degree to both sides, but without falling or past-pointing. The caloric reaction following the use of 300 c.c. cold water in the left ear indicated that the spontaneous nystagmus was still present with falling and past-pointing to the left. Further observation demonstrated that she could be relieved of her subjective symptoms by the use of iodides and chloretone internally and the use of galvanic treatments to the affected side.

The findings and observations prove that there is a chronic non-suppurative affection either in the nerve or in the endolabyrinth of the left ear. The decreased irritability following the caloric tests and the normal irritability following the galvanic tests indicate that there exists an involvement of the endolabyrinth. The unilateral affection of the cochlear and vestibular nerves speaks against the involvement of the pons or medulla. The etiology is not clear as all clinical and laboratory findings are negative. Constitutional causes, such as lues, neoplasms, vasomotor disturbances, disseminated sclerosis, migraine, encephalitis, trauma and intoxicants, have been known to produce the above-mentioned disturbances.

The interesting features observed were the dissociation of the labyrinthian reaction. When the normal labyrinth is irritated, nystagmus alone may be present without the sensation of falling or past-pointing. In the case studied, dissociation was observed in the spontaneous labyrinthian symptoms, and in experimental labyrinthian irritation. This patient presented characteristic falling without nystagmus spontaneously, and similar findings after caloric examination. This type of involvement, according to Brunner, is found only in organic lesions.

Until now the mechanism in the dissociation of the labyrinthian reaction has been hypothetic, as we have been without either histologic or anatomic examinations. Studies of normal and pathological anatomy, including experimental physiology in animals, have proven that the tracts for each of the reflexes (nystagmus to the eye muscles, falling to the spinal cord, past-pointing to the cerebellum) are arranged in separate paths. The conclusion is that the tract for the

nystagmus alone was involved. Brunner also comes to the same conclusion.

The clinical examination points toward a peripheral lesion, and as Brunner has mentioned, diseases of the peripheral nerve may also play a role as a causative agent in dissociated reactions.

The question is whether or not the dissociation of labyrinthian reaction is a symptom of a certain stage of a degenerating vestibular apparatus. It is possible the lesion is in the peripheral labyrinth, where there may be found individual selective reactions.

An interesting feature was the galvanic reaction. On the side where the caloric nystagmus was absent the galvanic nystagmus was prompt in comparison to the opposite side. This has also been observed in several other cases with unilateral loss of caloric nystagmus. This brings up the problem as to whether there is a certain tonus in the eye muscles which inhibit the production of nystagmus by irritation of the nerve. Examination of galvanic nystagmus with the breaking of the anode and cathode in this case of unilateral vestibular lesion does not give the same results that Mackenzie obtained. This case presented a greater galvanic irritability and a lessened caloric irritability. Mackenzie's findings were the opposite. The difference may be in that there is a nonsuppurative lesion.

## SUMMARY.

*1.* We are dealing with a rare finding of dissociation of labyrinthian reactions, as only past-pointing and falling is present and without nystagmus.

*2.* The lesion appears to be situated in the peripheral labyrinth and that perhaps the dissociation of the labyrinthian reaction is a symptom.

*3.* It is interesting that in unilateral loss of caloric nystagmus, the galvanic nystagmus on the same side is stronger.

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4660 N. Kedzie Avenue.

# NOTES ON RECURRENT MASTOIDITIS. REPORT OF A CASE OF BACILLUS MUCOSUS CAPSULATUS INFECTION.*

DR. H. S. MUCKLESTON, Los Angeles.

What is the final state of the mastoid process, following a successful surgical eradication of the disease, in an acute case?

In the depth of the wound healing is by growth of granulation tissue, which later is transformed into young connective tissue, and this in turn into firm connective tissue or a cicatrix. There is usually in some degree a sinking in of the scar below the level of the former skin area.

The under-surface of the skin-muscle coat, having no supporting cortex, has still a more or less well preserved periosteum, as its deepest layer.

From the bone walls of the cavity, as well as from the periosteum just mentioned, new bone may be formed. Experimental work on rabbits was reported in 1914 by Leduc at Bordeaux. The mastoid cells were opened and curetted, as would be done in the course of a classical simple mastoid operation; drainage was maintained for two weeks; 45 days later the animal was killed and the tissues of the mastoid area removed and sectioned. The tip cell (or rather the subtympanic cell corresponding to the cells of the tip in man) was found to be completely filled by tissue which, after decalcification, proved to be in a less degree fibrous, in a much greater degree osseous, the bone having reformed from the periosteum.

Comparable to this fibro-osseous healing is the process described in experimental animals by Samoylenko. Dogs and cats were used in this work, in a study of postoperative healing of the frontal sinus. Following a thorough cutting away of all mucosal tissue, healing was by periosteal growth and marginal bone regeneration. Six-and-one-half months after the operation, the following end-results were found: at the periphery numerous bony trabeculae, between which were meshes of connective tissue and blood vessels, whereas in the central portion there was only periosteum, which had grown up into what had been the frontal sinus space.

As a matter of clinical observation, Portmann and Retrouvey apply to the healing of the excavated mastoid process one or other of

*Presented before the American Laryngological, Rhinological and Otological Society, Western Section, at Del Monte, Calif., Jan. 27, 1930.
Editor's Note: This ms. received in Laryngoscope Office and accepted for publication May 3, 1930.

three descriptive terms: *1.* Fibrous tissue, dense in consistency, and usually depressed; *2.* fibrous tissue and new-formed bone, with less sinking; *3.* bone reformed throughout, at times defying detection, not differing in outline from the normal.

Of these types, undoubtedly the first is the commonest, the second less often seen, and the third exceptional.

The first class embraces, for a varying period, all cases; probably the large majority of healed wounds remain filled with fibrous tissue, which may become extremely dense. Urbantchitsch mentions the doing of a mastoid operation in a woman, age 55 years, in which case there was a perisinus abscess; three years later he again had cause to operate in the same site, and then found the lateral sinus was so enveloped in fibrous tissue that it could not be seen.

A fair proportion of cases progress to a limited degree of ossification. This represents nature's attempt at *restitutio ad integrum.* Many years ago Wolff, of Berlin, put on record his early observation; at a first mastoid operation a bone gap was left measuring 2.5 by 1.5 c.m., and at a later exposure this gap was found to have narrowed itself to only about 0.75 c.m. in diameter.

Complete ossification takes place sometimes, not often. There is formed a new cortex, thinner than the original, and even a new pneumatic structure has been recorded. Such an end-result came under my observation a few years ago, in a woman, age 39 years, who had undergone a bilateral mastoid operation in an eastern city five years prior to my examination. As a diagnostic help I had the mastoid areas radiographed, and was surprised to find pneumatized bone not differing markedly from the usual structure*. Alexander describes such a healing, with bone reforming, so to speak, under his eyes. Mouret makes the generalization that the mastoid process tends to take on once more its earlier anatomical type; a boy, age 7 years, was operated upon, and found to have his mastoid interior completely broken down; the wound healed with a depressed scar; six years later he again had to be subjected to a mastoid operation, on which occasion, while the region seemed to be less spacious than normal, all parts had reformed themselves, the cortex and trabeculae somewhat thin, but none the less forming a mastoid process in its entirety.

*Under What Conditions Does Later Suppuration Take Place?* In the majority of cases the patients are children, plainly because of their proneness to infections of the upper respiratory tract. In a

*This cannot be cited as a proved case. An attempt to get full details from the former surgeon was unsuccessful.

short period of eight months I have had four such little patients in my office, in three of whom the scar bulged a few days after the beginning of the ear symptoms, and had to be reopened, and in the remaining one the scar bulged as in the other cases, but suddenly receded with complete subsidence of the infection. The cicatrix offers less resistance to the invader, and melts away with great rapidity, whereas in a new case the cortex offers a firm wall confining the infection in restricted limits.

There are in the literature many papers and case reports dealing with this so-called recurrent mastoiditis, from the pens of Italian, Austrian, German, French, American and other otologists. Israel, of Turin, is credited with priority of authorship in this field, having published his observations of five cases in 1901. Edward B. Dench wrote a paper on "The Treatment of Recurrent Mastoiditis" in 1903.

In a paper presented before the Berlin Otological Society, in 1907, Wolff discussed the causes of recidivierende mastoiditis, and gave three main headings: *1.* Persistence of latent infection; *2.* reinfection from the middle ear by virulent organisms; *3.* reinfection from the middle ear by organisms of a low-grade of virulency, in the presence of an enfeebled constitution and a disposition to middle ear disease.

An excellent and very recent article on the subject is that by Georges Portmann and Henri Retrouvey, published in May, 1928. They advocate an open exploration of the reinfected mastoid field, in order to bring to light outlying cells missed at the original operation.

With adults the underlying pathology cannot be essentially different, yet in my experience the event of a reinfection is a rare one. I recall only two such patients, both in the sixties. One of them has given me much cause for reflection, and his case I wish to report with sufficient detail.

J. T. A., a man age 64 years, on Dec. 27, 1926, after some indiscretions of eating, developed fever, chills, nausea and left-sided earache. On Dec. 31, a spontaneous rupture of the eardrum took place, with free discharge of yellow pus, and with a resulting easing of distress and nausea. I was asked to see him on Jan. 3, 1927, and found proptosis of both eyes without diplopia, some puffiness of the eyelids, and suffusion of the conjunctivae. The left ear discharged mucopus. His general condition was poor, and he was in a mental state approaching stupor.

There was a history of recurrent intestinal upsets, thought to be due to irregular eating and to infestation by chilomastix, and accompanied by severe headache. He had at different times suffered from

ulceration of the tongue and buccal mucous membrane, and of the upper lip. His blood Wassermann reaction in 1921 and 1922 had been negative.

He was operated upon on Jan. 3, the left mastoid being opened and curetted. The cells were small, contained pus in beads, and their walls were softened. There was a wide exposure of the dura of the middle cranial fossa and of the lateral sinus; the intervening bridge of bone was softened, and was curetted away in great part. The hunt for infection was carried backwards, posterior to the sinus wall, and inwards towards the internal meatus.

The culture of the pus from the wound showed Gram-negative diplobacilli (Friedländer's?).

In spite of intercurrent trouble with his bladder and prostate gland, the patient made a good recovery from the operation. The wound healed in three weeks. He remained, however, in the hospital, and was later operated upon for prostatitis, again with a good recovery.

After these experiences he suffered possibly more than before from digestive disturbances; he would become nauseated, but would not vomit. The headache accompanying his upsets was no longer a feature; instead he was troubled with attacks of vertigo. These attacks of indigestion and vertigo became less and less frequent and severe, and his general condition improved markedly.

In April, 1927, he reported occasional dizzy seizures on sudden movement, and a feeling of pulsation about the ear and the mastoid. The operative scar was indrawn and not adherent; the eardrum showed a puckering posterior to the malleus. He heard the whispering voice not at all, and the conversation voice at 6 to 8 inches. He was able to use the telephone in this ear, but missed words.

Beginning in November, 1927, and continuing till November, 1929, there have been attacks of mastoid suppuration of a nontypical nature. Seven times has this occurred, at intervals of three to six months. With no stirring up by nasal or middle ear infection, the tissues underlying the scar become painful, the scar in a couple of days begins to rise flush with the skin, and in another two or three days an incision becomes necessary for the drainage of considerable amounts of pus. Invariably the drain is removed after the fourth or fifth dressing, and the incident is closed. Four times the pus has been cultured, and always the culture shows only a bacillus mucosus capsulatus.

Let me repeat that in these attacks the patient does not suffer from introductory earache. His first sensation is one of deep pressure,

and later he feels a pounding or pulsation as the infection develops. His drum membrane does not show hyperemia, nor, to my recollection, is there any sinking of the roof of the canal.

His hearing now is fairly acute, though less good than on the right side. $D_1$ is heard in either ear. His Weber test is positive to the left. Air conduction on the right is better than bone conduction, and on the left they are equal. The higher forks show a shortening, not greater than might be expected at his age. The $a_1$ fork shows a shortening on the right by eight and on the left by 15 seconds. There is no spontaneous nystagmus. Turning tests showed active responses; turning to the right brought an horizontal nystagmus for 27 seconds, and turning to the left a similar nystagmus of small amplitude for 35 seconds. With the head forward, turning to right and left produced falling tendency. After these four turnings there was nausea and pallor.

In July, 1928, the mastoid areas were radiographed. The loss of bone where the dura and the lateral sinus were exposed at operation is well shown. Behind the semicircular canals can be seen a small hummock of bone, whose structure suggests cancellation or small-celled pneumatization.

Except for incision and drainage, the patient's seven recurrences have received no special treatment. The dyes have been given their chance. Ultraviolet light has been used. There are other modes of treatment open, to which one may have to have recourse.

Although I am assured that vaccine treatment is not applicable to this particular infection, I have been advised, should the condition recur, to reculture the organism and to inject a sterile filtrate hypodermically. Also a bacteriologist friend suggests the bacteriophage route to reach the desired goal.

D'Herelle, in his book on The Bacteriophage and Its Behavior, makes a short comment on the investigations of Caublot. Working with the bacillus mucosus capsulatus, Caublot found a bacteriophage having at first a moderate virulence but after a few passages causing complete bacteriophagy of a bouillon suspension.

The patient has been apprised of the potential dangers of his condition. The question of re-entry into hospital for a full exploration has been several times put before him. The relative success of ambulatory treatment has satisfied him. It must be confessed that I have not reached the point of insisting on a wider search.

Somewhere, possibly behind the semicircular canals, there is a nidus of infection. The route to this depth would be difficult, but not by any means beyond finding; it must be remembered that the

sagging of the dura from its middle fossa level must be an obstacle in one's way.

In a comprehensive survey of the difficult and still somewhat confused problems of the bacterial excitants of otitis media, mastoiditis and their complications, Hesse has recently compiled a wealth of records. He reviews the earlier contributions from the time of Löwenberg (1880). His Berlin statistics, based on 276 cases, of which all but 21 were operative, show the following:

| | | |
|---|---|---|
| Nonhemolytic streptococci | 30 cases | 14.1% |
| Hemolytic streptococci | 122 cases | 44.2% |
| Staphylococcus albus | 16 cases | 5.8% |
| Pneumococcus (I, II, or IV) | 8 cases | 2.9% |
| Mucosus pneumococcus (III) | 46 cases | 16.7% |
| Friedländer's bacillus | 1 case | .35% |
| Proteus | 1 case | .35% |
| Proteus with streptococci | 2 cases | .7% |
| Staphylococci and nonhemolytic strept | 10 cases | 3.6% |
| Staphylococcus with hemolytic strept | 14 cases | 5.1% |
| Sterile | 17 cases | 6.2% |

The single case of infection by Friedländer's bacillus was that of a boy, age 15 years, who died in the sixth week of an acute ear infection. The organism was recovered from the antral pus and from the spinal fluid. This fatal ending was one of 13 in the total of 276. The organisms found in these 13 cases were hemolytic streptococcus in three, pneumococcus mucosus in seven, staphylococcus in one, Friendländer's bacillus in one, and no bacterial growth in one.

Zange had reported, in 1912, two fatal cases of infection by this organism in otitis media.

Its viciousness in pulmonary diseases is well known. Its entry to the general circulation sets up a bacteremia always fatal.

Yet, on the other hand, it may induce a pulmonary disease not easily distinguishable from tuberculosis, a pulmonitis of a chronic and migratory type. Only a short time ago three cases of this kind with satisfactory outcome were reported by Collins and Kornblum; all of this group were in the late years of adult life; the writers say that there is on record only one single case where the patient has been a young person.

## CONCLUSIONS.

It has been my endeavor to put before you:

1. The mode of healing of an acute mastoiditis after operation.

*2.* The problem of recurrence: *a.* from a wholly new infection; *b.* by a reawakening or a reactivation of a dormant infective agent.

*3.* The rarity of an invasion by the bacillus mucosus capsulatus.

*4.* The possibility of variability on its effect: *a.* in the young, a high virulence (?); *b.* in the elderly at times a relatively low virulence (?).

*5.* Certain modes of treatment to which one may have recourse: *a.* further surgical work; *b.* bacteriophage; *c.* injection of filtrate.

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# CHRONIC SUPPURATIVE OTITIS MEDIA ASSOCIATED WITH TUBERCULOUS MENINGITIS PRESENTING LOCALIZED INTRACRANIAL SYMPTOMS.*

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Chronic suppurative otitis media is prevalent in children and is independent of tuberculosis and tuberculous meningitis. Tuberculous meningitis is usually a generalized miliary disease in about 75 per cent of the cases and the infection is generally carried by the lymphatic system. The disorder is most frequently seen in childhood, especially prior to the sixth year. In approaching our subject it is best that we visualize the problem from various angles, *i. e.:* *1.* Chronic suppurative otitis media; *2.* tuberculous meningitis; *3.* localized intracranial symptoms; *4.* a combination of the entire group.

I have in mind a group of cases of chronic suppurative otitis media presenting typical acute mastoid symptoms with postauricular edema and perforation of the cortex. In several cases of this group it was noted that the bony structures and the necrotic tissues that were removed were somewhat paler than that found in the ordinary cases of mastoiditis. In brief, these cases had a history of intermittent suppurative otitis media persisting long enough to be classed in the chronic group. The final attacks started with the fulminating symptoms of acute mastoiditis and the complications which followed terminated in tuberculous meningitis, the course of the disease being fatal.

We had another group of cases that presented chronic suppurative otitis media with meningeal symptoms. Mastoidectomies were performed and pathology was found in each mastoid. In the course of a few days intracranial symptoms developed and two of these cases these symptoms preceded operative interference. The questions arising were: *1.* Is tuberculous meningitis a primary condition? *2.* Is it secondary to a tuberculous lesion from other parts of the body? *3.* Is it secondary to chronic suppurative otitis media? *4.* Is the chronic suppurative otitis media complicated by an acute exacerbation the cause of the reactivation of a distant latent tuberculous focus and thus producing the tuberculous meningitis? From the

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histories obtained, it was established that there were no chest involvements nor any gross tuberculous lesions that could be determined clinically, although in three instances, the von Pirquet was found to be positive. The thought that I wish to promulgate is this: If the underlying factors causing chronic suppurative otitis media have been removed, then how are we to cope with the problem of chronic suppurative otitis media in children? Are there any stepping stones in the course of this disease whereby we could determine preintracranial complications and by some means, operative or therapeutic, attempt to ward off this frightful affliction of tuberculous meningitis? Let us assume that the usual routine of studies were made, such as X-ray, blood and urine analysis, cytological and bacteriological studies from the external auditory canal and middle ear, vaccines administered and tonsils and adenoids removed—then what? I should like to suggest that suppurative conditions of the middle ear and mastoid be eradicated much earlier than is in vogue at the present time. It is current thought that tuberculous meningitis spreads through the lymphatic system. It is also possible that the disease may reach the meninges by continuity. Kopetzky, however, states that the meningitis is produced through infection via the bloodstream, and MacEwen reported a case where he found that the meninges had been invaded through the petrosquamous suture. In a small group of postmortems we were unable to find any bony destruction of the petrous portion of the temporal bone. Irrespective of the above postmortem findings, I still feel that some of these cases should have been operated upon before intracranial complications had developed. The perplexing question is this: Would a spinal puncture and the study of the fluid from a cytological, chemical and bacteriological analysis have thrown a ray of light into our dilemma? (Bearing in mind the manometer, the pressure and quantity removed.) If I may, I should like to reiterate a few of the gross normal findings in the spinal fluid: *1.* cellular elements; *2.* glucose, *3.* chlorids, etc. As the disease progresses, definite changes take place in the spinal fluid. There is an increase in the cellular components, although ordinarily in tuberculous meningitis, the lymphocyte should be the predominating cell. However, the polymorphonuclear is often present in great numbers. Amongst the other changes, there is a slow reduction of Fehling's, an increase in the protein, which can be verified either by the Noguchi butyric or Levinson test. Possibly the colloidal gold with the low curve consisting of a slight decolorization, plus the chlorid reduction, will in the future aid us in pretuberculous meningeal diagnosis.

We are cognizant of the three curves in the colloidal gold test, namely, *1.* completely decolorization, which is significant of paresis; *2.* moderate decolorization, which is indicative of lues; *3.* slight decolorization, which is pathognomonic of tuberculous meningitis.

In a study of cases by Dr. Winkleman and Dr. Blumberg, at the Philadelphia General Hospital, they found in some tuberculous conditions a relationship between the colloidal gold, the chlorid reduction and Levinson precipitation test. The postulate is this: Either these findings may be a forerunner of a tubercuolus meningitis, a tuberculoma or the result of an arrested lesion in the brain area or brain stem. The picture might be visualized the same as that of an arrested lesion in the lung and when there is an acute flareup there is reactivation. The same might be true of a tuberculous lesion in the brain stem. What course should we pursue as otologists? Assuming that the colloidal gold, the chlorids and the Levinson precipitation tests are the warning signals of a future tuberculous meningitis or the result of a quiescent tuberculous condition in the meninges, are we to stand by and adopt the watchful waiting policy or should we perfom a mastoidectomy, removing the source which may be a contributory factor in the causation of tuberculous meningitis? Will we disturb a quiescent balance by operative interference? From my observation, it seems to me that early eradication might ward off a potential tuberculous meningitis.

Tuberculous meningitis may occur in the wake of a chronic suppuration of the middle ear. It is possible that tuberculous meningitis may be a primary condition. On the other hand, it may be secondary to a nontuberculous suppuration of the middle ear in a patient suffering from a latent tuberculous affection in some other part of the body, such as the bones, lungs, glands, and indirectly the meninges become involved through the lymphatic system. This is due to an acute flareup in the middle ear and mastoid. It is evident that tuberculous meningitis is not the cause of chronic suppurative otitis media, because the symptoms are too fulminating, and the patient usually succumbs before chronicity is firmly established. Then, what relationship is there between chronic suppurative otitis media and tuberculous meningitis? The following may predispose one to tuberculous meningitis: *1.* Chronic suppuration; *2.* secondary infection of the middle ear by Koch's bacillus; *3.* chronic infection acting as a debilitant producing asthenia, anemia and thus predisposing the patient to tuberculous infection; *4.* tuberculous infection of the ear and mastoid with a break in the barrier producing a meningitis through the lymphatic system or by direct continuity.

We are cognizant of the fact that chronic suppurative otitis media may terminate in a cerebral or cerebellar abscess or a diffuse meningitis. Very often we neglect the thought that tuberculous meningitis may be the culprit for a meningeal involvement. Therefore, tuberculous meningitis presenting localized intracranial symptoms is rather a perplexing situation, especially when the syndrome exists. I should like at this time to quote two cases to illustrate the above statement.

We are confronted with a child, age 5 years, who had had chronic suppurative otitis media for the past 4½ years. At the age of two, he had his tonsils and adenoids removed. His present illness began 10 days prior to hospitalization. There was a high temperature, ranging between 102° and 103°, increase in the suppuration in the middle ear, especially the right ear, slight photophobia and extreme irritability. This was followd by slight drowsiness with an occasional disproportion of pulse and temperature. On the eighth day, it was noted that there was an external rectus palsy with a lower facial palsy, a suggestive Babinski, a minus MacEwen sign and a beginning Kernig. X-ray revealed bilateral destruction of cells in both mastoids. Eye examination disclosed a papillitis. On the tenth day the Kernig was more marked, Babinski was present with a suggestion of Jacksonian convulsions in the left arm. This was followed by a paresis, rather than a paralysis. This picture suggested a temporosphenoidal lesion on the right side and, in this instance, the problem of operative interference and spinal puncture was before us. At this time a second eyeground revealed a choked disc and we, therefore, had to overcome the intracranial pressure. On the twelfth day, the same picture continued and, in addition, the patient developed distinct Jacksonian convulsions in the upper and lower extremities, which were followed by a palsy. Our first thought was to consider the presence of the chronic suppurative otitis media. Secondly, should we open the mastoid and explore the middle fossa? Having had similar experience with negative intracranial findings, I consulted with Dr. Winkleman and Dr. Fay, my colleagues at Temple University Hospital. Dr. Winkleman thought that instead of it being an acute cerebritis, that it was probably a case of tuberculous meningitis. He suggested a spinal puncture for study. We found many lymphocytes, a few polymorphonuclear leukocytes, a reduction in the sugar content and a low chlorid of 520 mng. Before the laboratory reports were returned, I consulted with Dr. Fay. At this time the intracranial pressure became much more marked, the convulsions more frequent and a suggestion of general convulsions. The child became stuporous and gradually comatose. We were now con-

fronted with intracranial pressure, coma, convulsions and acidosis. All manner of treatment was suggested, including intravenous introduction of glucose for the possible relief of acidosis and pressure. In spite of all treatment, the patient died, 16 days after admission to the hospital. On postmortem a moist brain with a tuberculous basilar meningitis was found.

Another case observed by the writer was a child, age 2 years, who had an acute mastoid with the typical postauricular edema. This was superimposed on a chronic suppurative otitis media. The course of the disease was asymptomatic. On the third day following simple mastoidectomy, we noted a dilatation of the pupil on the side of operation. On the fifth day, the child developed a horizontal nystagmus, vomiting, drowsiness, a subnormal temperature and a pulse rate of 66, which were suggestive of cerebellar involvement. At this time the eyeground revealed a papillitis. With the new symptoms present, and with an acute mastoid of eight days' duration, we felt that a secondary operation was indicated. After exposing the middle and posterior fossae, we failed to locate any collection of pus to explain the symptoms present. Three days after secondary operation there followed a peculiar group of fleeting symptoms, at times referable to the middle and posterior fossae and at other times indefinite, vague symptoms of generalized meningitis. Eighteen days after primary operation, a postmortem was performed and we found a moist brain with a basilar tuberculous meningitis.

*Comment:* It is possible that an acute tuberculous meningitis may be associated with acute mastoid disease. In a general way, the symptoms described in the above cases are characteristic of the group of patients upon whom we operated and upon whom we did not find any intracranial pathology, the postmortems revealed a tuberculous meningitis.

## CONCLUSIONS.

Is a spinal puncture indicated when patients present intracranial localized symptoms? From my experience, I would say that it is. Cases presenting localized intracranial symptoms should have spinal punctures performed; furthermore, this should not be attempted without the manometer. My reason for recommending spinal puncture far outweighs the danger in its performance. This will afford us an opportunity to make biochemical studies and will give us an inkling as to our diagnosis. Perhaps we can in this way avoid operative interference and treat the case as it presents itself.

I also feel that it is advisable to make periodic spinal fluid studies to determine whether or not the normal fluid substances are present,

especially concentrating our attention to the colloidal gold reaction and its relationship to the chlorid reduction. A typical colloidal reaction, a Levinson precipitation test with a diminution in the chlorid is often found before any meningeal symptoms appear. Assuming that the above changes take place in the spinal fluid, we are to conclude that there may be a premeningeal stage or that there is a quiescent meningeal stage. Furthermore, from a prognostic standpoint our method of procedure may depend on our findings in the colloidal gold, chlorid and Levinson tests; that is, whether to remove a possible focal cause or to adopt the policy of watchful waiting. At least we will have had the satisfaction of knowing that something is happening in the meningeal area. By periodic punctures we can watch the progress of the disease and determine its relationship to the meninges.

In cases of chronic suppurative otitis media in children, where all other sources of foci have been eliminated, such as tonsils and adenoids, sinuses, gastrointestinal tract, *et al.;* why not suspect tuberculosis as the underlying factor, especially where there was a typical colloidal tubercular curve with a diminution in the chlorids and a positive Levinson precipitation test? The question whether the ear is a primary factor in the causation of tuberculous meningitis is doubtful. There is no doubt that the tuberculous meningitis is caused by some active or quiescent focus, which may be either glandular or peribronchial in origin, etc. From my experience, however, it is an established fact that the torch of tuberculous meningitis may be kindled by an acute otitic exacerbation on a chronic suppuration. Since the avenue of approach for mastoidectomy is so simple, why not remove the source and thus eventually avoid a potential tuberculous meningitis? Before operating on any chronic suppurative otitis media cases, especially in children, I feel that it is of the utmost importance to perform at least one spinal puncture, for the following reasons:

*1.* To determine whether the normal constituents are present in the fluid.

*2.* To seek the abnormal constituents, such as the cytological and chemical changes in the fluid.

*3.* To determine whether there is a slow drop in the carbohydrates and chlorids and, if such be the case, it is suspicious of tuberculosis.

*4.* An increase in the globulin, a positive Levinson, an increase in the cellular count, especially the lymphocytes, are findings that are indicative of tuberculous meningitis.

5. Last, but not least, special emphasis should be placed upon the colloidal gold, chlorid and Levinson precipitation tests and their relationship to tuberculous meningitis.

In closing I wish to say that the prognosis of chronic suppurative otitis media associated with tuberculous meningitis is fatal. Operative interference should be instituted before meningeal symptoms are present. My chief purpose in the presentation of this paper is to emphasize the importance of searching for this complication and making an early diagnosis, so that unnecessary surgery may be avoided.

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# PLASMOCYTOMA OF THE NASAL CAVITY.*†

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It is a well known fact that malignant growths are not encountered with great frequency in the nose. Primary carcinoma is not common; sarcoma, on the other hand, is more common. Other tumors seen are papillomata, angiomata, epitheliomata, and myxomata. Very rarely one sees a tumor in the nose composed almost entirely of plasma cells. A careful search of the American literature reveals an occasional case of plasmoma of the eye, but very few reports of the occurrence of plasmocytoma in the nose. This case is presented as one of the rarest of nasal tumors encountered.

The patient was admitted to the Laryngological Service of Mt. Sinai Hospital on Aug. 27, 1929, complaining of left-sided nasal obstruction for the past year and pain and headaches for the past three months. His family and past personal history are irrelevant. For the past year the patient complains of inability to breathe through the left side of the nose; this has been progressively becoming worse and associated with this he had a foul-smelling nasal discharge, especially during the colder months. The headache and pain had been quite noticeable for the last three months. In addition to these symptoms the patient has had slight morning cough, shortness of breath, but no expectoration, no palpitation, no precordial distress. Physical examination revealed a strong male with mild generalized atherosclerosis, left purulent chronic otitis media, blood pressure of 168/118, and moderate emphysema. The remainder of the physical examination was negative except for the local condition. The right side of the nose, except for slight evidence of inflammation in the ethmoid region, revealed no abnormality. On the left side of the nose there was a thick purulent secretion in the inferior meatus. Above this and occluding the middle meatus was seen a soft, whitish mass which seemed to spring from the lateral part of the nose, the exact site of origin could not be determined; it bled quite freely on manipulation and probing, and it felt friable. This mass did not impinge on the left Eustachian tube. The nasopharynx was negative. Blood Wassermann was negative. Complete blood work-up did not

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reveal any evidence of a blood dyscrasia. X-ray of the sinuses revealed a cloudiness of the left antrum, ethmoid and sphenoid, and a slight cloudiness of the right ethmoid region.

Under local anesthesia a specimen was removed from the tumor mass. Because of the unusual character of the tumor, Dr. Klemperer requested a second specimen. These were studied and reported plasmocytoma.

*Pathological Description:* Pathological sections show a very cellular tumor, the cells being supported by a rather scanty connective tissue stroma containing arteries, veins and capillaries (Fig. 1). In places the stroma surrounds larger groups, producing an alveolar arrangement of the cellular elements. On examination with medium magnification one is at once impressed by the complete uniformity of the constituents. The cells lie closely packed without intervening stroma fibres (Fig. 2). The cells are oval to polygonal, occasionally round, often with flattened edges due to mutual pressure (Fig. 3). Their average measurements are 10.5x8 microns or 10 microns in diameter. The cell outline is sharp, within the well preserved round cell elements. The large (5 microns) round nucleus shows a distinct nuclear membrane; it always contains one or more large round nucleoli (Figs. 3 and 4), which stain the same shade of color as the cytoplasm. The chromatin frequently forms a fine reticulum through the nucleus, particularly in the larger cells, whereas within the smaller cells it is generally clumpy, forming coarse particles which are often attached to the nuclear membrane, leaving the center clear for the nucleolus, thus giving the appearance of the spokes of a wheel (Fig. 4). The nuclei show quite frequently a distinct paling and disintegration. Mitotic figures are present but not frequent. One must search many oil immersion fields before one encounters a typical karyomitosis. More frequently one observes cells with two nuclei. The cytoplasm of all the cells is abundant, it often surrounds the nucleus. Frequently, however, the nucleus appears pushed to one side (Fig. 3). The protoplasm is often foamy and contains vacuoles. With hematoxylin-eosin it stains a dull grayish-red, with methyl green-pyronin, according to Unna-Pappenheim, a very distinct pink with frequent deep red clumps. Only sporadically does one observe a zone of clearing around a nucleus.

*Discussion:* From this description it appears that we are dealing with a very cellular neoplasm with the chief characteristics of a uniform cell type in either diffuse or alveolar arrangement. An interpretation of the tumor as a large round-cell sarcoma is obviated by the entire lack of intercellular fibres. This is very well demon-

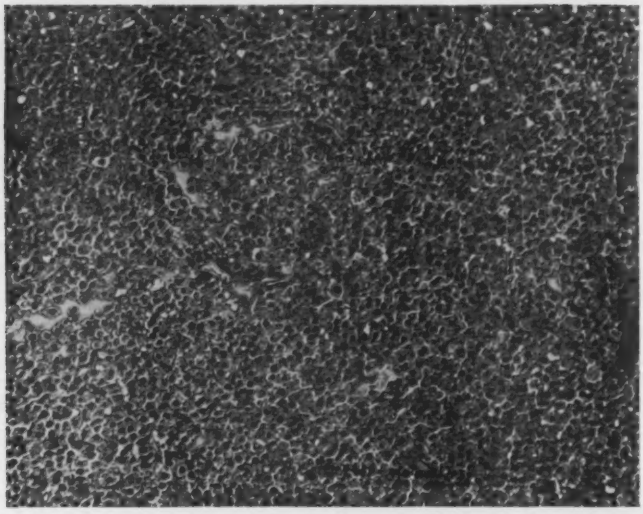


Fig. 1. Section showing the cellular neoplasm composed of cells of uniform type with scant stroma.

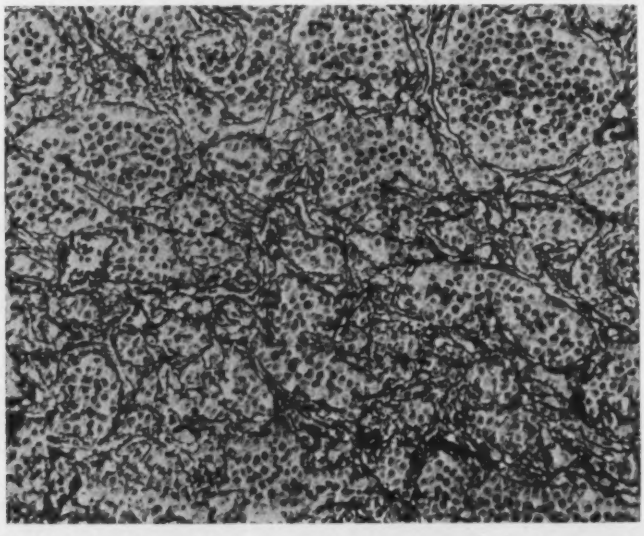


Fig. 2. Bielschowsky stain showing the fine stroma fibres surrounding larger and smaller groups of cells but not surrounding the individual cells.

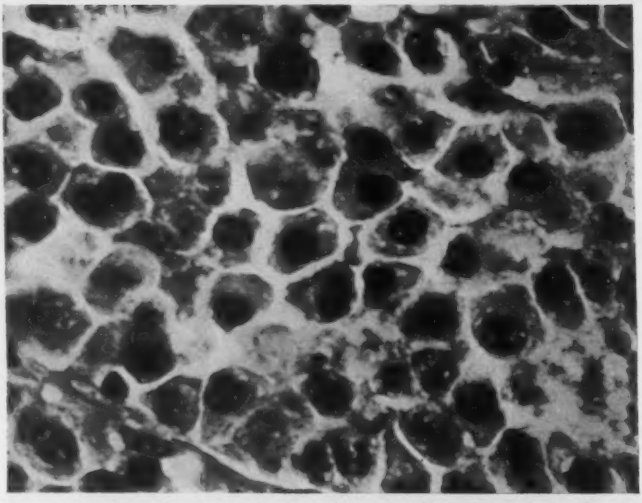


Fig. 3. Section showing minute detail of cells and nuclear structure. Note the cell showing true mitosis and two nuclei and eccentric location of nucleus.

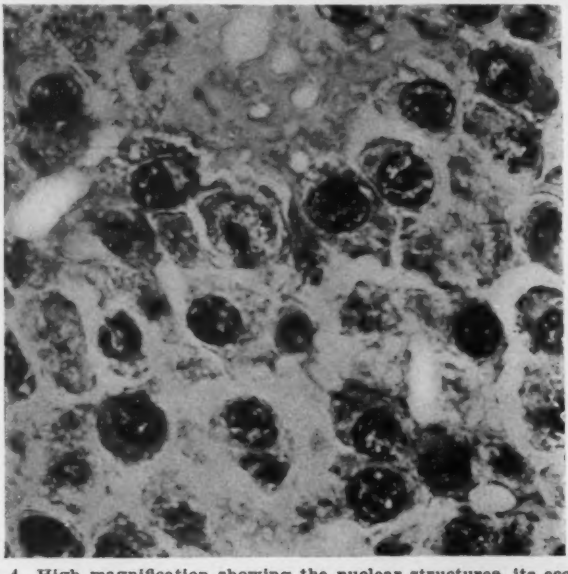
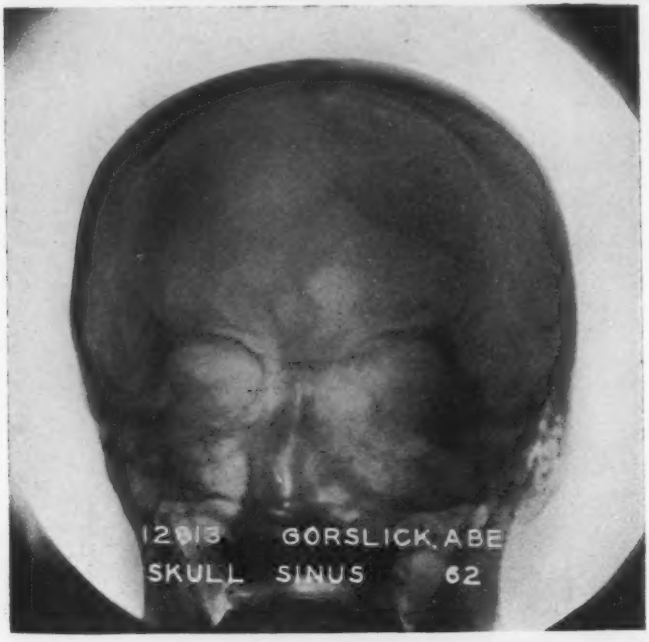


Fig. 4. High magnification showing the nuclear structures, its eccentric location in the cells, the distinct nucleolus, and the occasional "wheel" arrangement of the chromatin. One cell showing juxtanuclear halo about nucleus.

strated in Fig. 2, a special preparation stained by Bielchowsky's method to bring out even the most delicate fibres. One might be inclined to consider the structure as that of a carcinoma; however, neither the cell type nor the structural arrangement conforms with any one of these epithelial neoformations commonly found in the nasal cavity. It is neither a pavement epithelial carcinoma nor a mucous carcinoma, nor a simple columnar-cell carcinoma. To conceive of it, however, as a highly anaplastic neoplasm whose cells do not conform with any definite cell type is obviously impossible,




because of the conspicuous regularity of the constituent cell elements. The size and shape of the cells and the large pale nucleus with the outstanding nucleoli, suggests a close resemblance to the lymphadenoid tissue, in particular to the early lymphocytes or lyphoblasts. The staining quality of the cytoplasm, the frequently eccentric location of the nuclei, the occasional occurrence of wheel nuclei, and of perinuclear paling of the cytoplasm on the other hand are characteristics which relate the cells of the tumor to the plasma cells. The

plasma cell has been recognized since von Marschalko's description as a derivative of the small lymphocytes. Schridde, however, could demonstrate that lymphoblasts may undergo the same peculiar basophilic transformation of their cytoplasm as does the small lymphocyte. He has proposed the term lymphoblastic plasma cells for such cells which combine the typical lymphoblast nucleus with characteristics of plasma cells, such as eccentric nucleus, darker stain of the cytoplasm, and juxtanuclear halo. It appears from the description that our tumor is composed of cells which very closely resemble this cell type. We are, therefore, inclined to interpret our case as lymphoblastic plasmocytoma of the nasal cavity.

Tumors of the nasal cavity composed of plasma cells have been described, though not frequently. A comparison of the figures of the various authors shows a close resemblance of our pictures with those given in the respective articles. The most striking feature of all of them is the conspicuous uniformity of the cells which conform either to von Marschalko's or Schridde's plasma cells.

It is impossible to determine definitely the source of origin of lymphocytes, whether hematogenous or histogenous. Whenever lymphocytes are found in connective tissue, whether they come from the blood or connective tissue, they can form plasma cells according to Schridde, if conditions are suitable. On the other hand there are others (Unna, Joannowicz, Kingsley) who believe that the plasma cell is a development from the common fibroblast. This view is explained by the wider limits given to the conception of the plasma cell by the authors quoted. However, if one considers the von Marschalko type as the true plasma cell then there is no evidence of its fibroblastic origin.

It remains then only to define the position of the plasmocytoma of the nasal cavity regarding its oncology. The plasma cell is commonly found as a cell of inflammatory tissue. One is, therefore, primarily inclined to conceive of neoformations composed of plasma cells as inflammatory granulation tumors. Such an interpretation, however, is contradicted by various experiences in general pathology. The occurrence of multiple myeloma of the bones formed exclusively of plasma cells (generally lymphoblastic plasma cells, according to Klemperer) and the observation of plasma cellular leukemia (Gohn and Roman) indicates that the peculiar transformation of lymphocytes and lymphoblasts may occur also in conditions other than inflammation. This observation was further borne out by Maximow, who noted this in tissue cultures, and by Schridde. The particular features of our case suggest the conception of plasmocytoma of the

nasal cavity as a tumor formed exclusively of lymphoblasts and lymphoblastic plasma cells—in other words, a lymphoblastoma with more or less extensive plasma cellular transformation. This places the plasmocytoma in a category close to lymphosarcoma of the nasal mucosa, a well known neoplasm of the upper respiratory tract.

*Treatment:* A review of the literature revealed the interesting fact that although the plasmocytoma does not invade adjacent tissues and does not always involve the neighboring lymph glands, it generally recurs, even when extirpated surgically. Furthermore, many of the cases reported in the literature were multiple and were associated with a chronic cachexia. This was not so in our case.

No attempt was made to remove the tumor surgically. Three radium seeds with a platinum filter were placed in the tumor mass. After ten days they were removed. This was followed by a course of deep X-ray therapy. The tumor mass, which formerly completely obstructed the left side of the nose, is markedly diminished in size. It has shrunken down so that the patient now has adequate breathing space and relief of almost all symptoms.

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Mt. Sinai Hospital.

# CHRONIC ABSCESS OF PHARYNGOMAXILLARY FOSSA WITHOUT SYMPTOMS. REPORT OF A CASE.*

Dr. Ivan F. Weidlein, Cleveland.

Sinus tracts or fistulae anywhere in the cervical region are always of interest because of the possibility of their embryonic origin as well as because of their clinical importance. This case report deals with a deep pocket in the pharyngomaxillary region having an outlet which was discovered accidentally during an operation for the removal of tonsils and which apparently gave no symptoms referable to its presence. Nevertheless, the presence of such a cavity offers many possibilities for differential diagnosis.

The pharyngomaxillary fossa is roughly funnel-shaped, with the base up and the point down. The base is formed by the base of the skull and inner surface of the mastoid process. The apex, through which emerges the carotid sheath, lies opposite the lower limit of the angle of the jaw[1]. The internal boundary of the fossa is the superior constrictor muscle of the pharynx; the external boundary is the inner surface of the ascending ramus of the jaw, covered by the internal pterygoid muscle. Superiorly, the parotid gland, which has no sheath over its inward prolongation, also enters into the external limits. The upper cervical vertebrae, covered by the prevertebral muscles, make up the posterior wall. The anterior boundary is formed largely by the sternomastoid muscle.

*Case Report:* The patient, an adult white female, age 30 years, entered the Lakeside Hospital, Sept. 15, 1926, with the complaint of recurrent sore throat and quinsy of 12 years' duration. Previous to admission she had had peritonsillar abscesses, twice on the left side, once on the right side, and on both sides the preceding winter. The last time the abscess on the left ruptured spontaneously, while that on the right side was incised.

The history revealed that the patient had acquired syphilis with secondary skin eruptions in October, 1914, two months after marriage, for which she was treated in the dispensary. At the time of entrance into the hospital the blood Wassermann was negative. She

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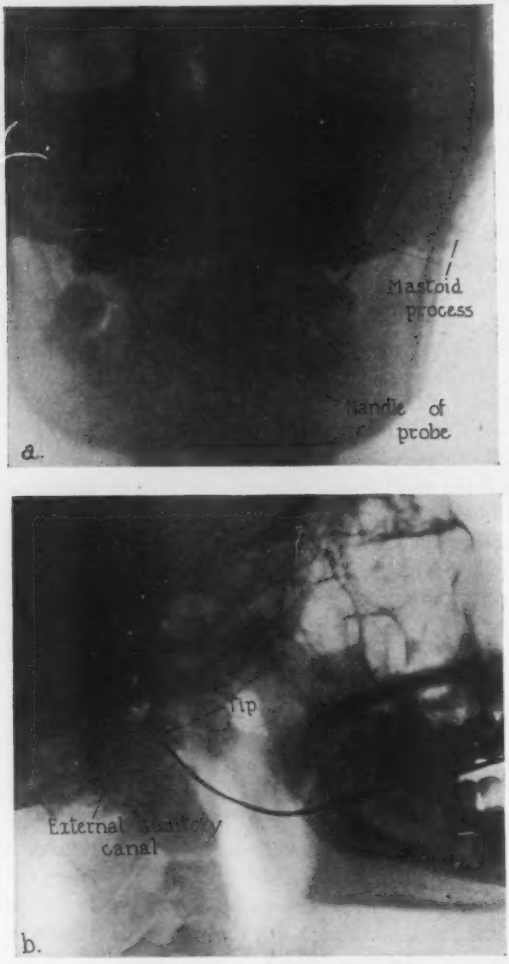


**Fig. 1. Roentgenograms showing location of probe in sinus tract. (a) Posterior view. (b) Lateral view.**

had been treated in the gynecological, genito-urinary and medical dispensaries, in the latter for luetic aortitis. She was seen in the otolaryngological dispensary on Dec. 20, 1924, when a diagnosis of chronic tonsillitis was made and tonsillectomy advised. There had been no previous operations.

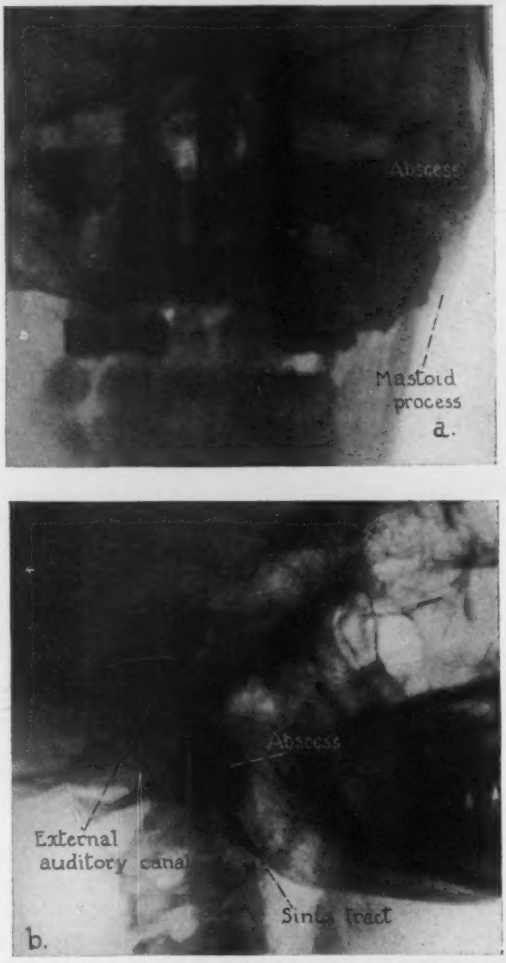


Fig. 2. Roentgenograms after injection of 15 c.c. lipiodol. (a) Posterior-anterior view. (b) Lateral view showing abscess cavity and sinus tract.

The physical examination showed a rather obese adult white female with aortitis but no enlargement of the heart. There was no tenderness and no tumors of the abdomen. The urine examination was negative. The otolaryngological examination was essentially negative except for the tonsils. The anterior pillars of the tonsils

presented numerous scars from previous incisions for the drainage of peritonsillar abscesses. About two-thirds the distance down on the right anterior pillar of the tonsillar fossa was demonstrable a sinus tract, which apparently extended around and behind the tonsil itself. No discharge could be expressed from the opening. The submaxillary lymph glands on either side were enlarged but not tender.

On Sept. 16, 1926, under local infiltration of 0.5 of 1 per cent novocain, a bilateral tonsillectomy was performed. Both tonsils were adherent, the left to the more marked degree. In the posterolateral wall of the right fossa about midway down was a sinus tract admitting a probe which readily passed upward, backward and laterally toward the tip of the mastoid process for a distance of 3.8 c.m. (see Fig. 1). Later this sinus was injected with 15 c.c. of lipiodol and Roentgenograms were taken (see Fig. 2).

*Report of Roentgenograms:* "Sept. 18, 1926: Films of the right mandibular region with metallic probe inserted into the sinus opening show that the tip of the probe extends upwards and posteriorly to a point around the coronoid process of the right mandible and a little posterior to it.

"Films of the same region taken after injection of lipiodol into the sinus opening from the right tonsillar fossa show a ribbon-like shadow of increased density about 20 x 3 m.m. in size and situated somewhat posterior to the angle of the right mandible. This shadow is connected with another irregularly defined circular shadow of increased density which is situated just above, its diameter being about 25 m.m.

"The appearance is quite suggestive of a sinus in or around the parotid gland, in all probability inflammatory in origin. A congenital cleft would probably be regularly defined."

The sinus tract in the anterior tonsillar pillar was excised and the edges approximated with two interrupted sutures of catgut. No sutures were required for hemostasis during the operation.

The postoperative course was uneventful. The patient was discharged from the hospital 24 hours after operation, with a final Roentgenographic film as a check. One week later she returned to the clinic for the usual follow-up examination; the wounds were found to be repairing normally, with healthy granulation tissue.

The patient refused to return again for examination because she felt it unnecessary. Three years later a final examination in her home revealed a perfectly healed process. No sinus was present, either through the anterior pillar of the tonsillar fossa or in the

fossa itself, and there had been no symptoms of any nature referable to the pharynx since the immediate recovery following the operation.

The Roentgenograms taken with the probe *in situ* and later after the injection of lipiodol clearly showed this cavity to be in the pharyngomaxillary fossa. The irregularity of the outlines of the shadow of the oil would suggest an abscess rather than a congenital cyst of any nature.

A branchiogenic cyst in this locality would of necessity have arisen from the second cleft. Even then, one would not expect to find it located so high and its contour would have been more regular in outline. A congenital cyst would not have healed spontaneously as this one did. A cyst of such dimensions usually gives symptoms of external swelling or tenderness. The complete type of branchiogenic cyst has both an internal and an external opening, but the blind type has only one opening, which may be either internal or external[2]. The external opening, if present, is near the anterior margin of the sternomastoid muscle between the hyoid bone and clavicle. The internal opening is near the tonsil, which also develops from the second branchial cleft[3].

An abscess in the pharyngomaxillary fossa could arise from several sources and the loose tissue of the fossa would offer no limitations to extension until the definite confines of the fossa itself were reached. Since the inner prolongation of the parotid gland, which helps to make up the outer boundary, has no capsule, an infection within the gland could be the cause of such an abscess. However, there would then have been symptoms referable to the parotid gland before the development of the abscess.

Another possible source of infection could have been from the lymph glands on the posterior wall. These are the glands which may suppurate and produce a retropharyngeal abscess. The patient's age and lack of local symptoms would be against such an etiology. A cold abscess originating from tuberculosis of the upper cervical vertebrae could be excluded by Roentgenograms, and by lack of any deformities.

Infection having its origin from the inner surface of the mastoid process or along the jugular bulb would have given symptoms of localized pain or infection or evidence in the Roentgenograms.

The most plausible explanation of the source of infection of this cavity would be an abscess developing from the tonsil, which was manifested early as an infection in the form of a peritonsillar abscess on repeated occasions during the two years preceding the tonsillectomy. The infection may have gained access to the pharyngo-

maxillary fossa by rupture of the abscess through the palatopharyngeus muscle, or when the incision for drainage was made the scalpel may have pierced the same muscle.

The probable reason why no symptoms referable to the abscess were noted was that the acute symptoms were coincident with those of the peritonsillar abscess and were unnoticed because of the predominant symptoms of the peritonsillar abscess. Later the sinus tract through the anterior pillar of the tonsil and the pharyngopalatine muscle was large enough to provide free drainage through the chronic stage. The enucleation of the tonsil provided more effective drainage than the fistulous tract had afforded and complete recovery ensued.

## CONCLUSIONS.

*1.* Any fistulous tract in the vicinity of the tonsil is a problem for differential diagnosis.

*2.* Care must be taken not to piece the palatopharyngeus muscle by too deep an incision for peritonsillar abscess, because of the danger of infecting underlying cervical structures.

*3.* Roentgenograms of shadow-casting fluid media are of great aid in differential diagnosis of fistulae of the cervical region.

*4.* Deep abscesses of the neck are not always serious and may give no symptoms.

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Lakeside Hospital.

## DERMOID TUMOR OF THE POSTERIOR PHARYNGEAL WALL IN A CHILD TEN MONTHS OLD.*

DR. A. O. FREEDMAN, Montreal.

The patient, a child age 10 months, was referred to our clinic by the family doctor for dysphagia and frequent attacks of dyspnea, particularly while feeding. The mother, who accompanied the child, gave the following history:

Normal delivery. There are several more children at home, living and well. The child was apparently well till three months ago, when the mother noticed that it had some difficulty in swallowing. During the past three months the difficulty in swallowing progressively increased and the child did not gain in weight. The family doctor recommended that the child be taken to a hospital for the removal of its large adenoid.

*Present Condition:* A pale, undernourished, miserable looking child of stated age, who seemed to have some difficulty in breathing.

On opening the mouth, a pear-shaped tumor presented itself, protruding between the pillars of the fauces and lying above the root and dorsum of the tongue. The mass was smooth and rounded, filling the whole space between the tonsils, soft palate and root of the tongue (see Fig. 1 "2").

On quiet respiration the tumor receded into the pharynx and appeared as in Fig. 1 "1".

It was evident that the tumor was movable and pedunculated. The pedicle of the tumor was attached, high up, to the center of the posterior pharyngeal wall.

*Operation:* No anesthesia was used. The tumor was seized by a mouse-toothed tenaculum, and the pedicle was encircled by a wire tonsil snare and severed. This procedure confirmed our rather difficult preliminary examination as to the exact attachment of the pedicle to the central line of the posterior pharyngeal wall. There was practically no bleeding. The child has made an uninterrupted recovery and is thriving very well.

*Pathology:* The tumor when removed measured 3 x 1½ c.m. It was smooth, pale in color and rounded. Through the center of the cut pedicle protruded a cartilaginous "pip". There were no hairs

*From the Departments of Oto-Laryngology and Pathology of the Montreal General Hospital.

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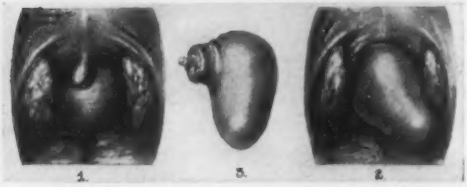


Fig. 1. (1) Tumor in situ during quiet respiration. (2) Tumor in situ when child cried or struggled. (3) Tumor after removal.

Fig. 2. Longitudinal section through the center of entire tumor, showing surface covered with squamous epithelium, and core consisting of fat and fibrous tissue.

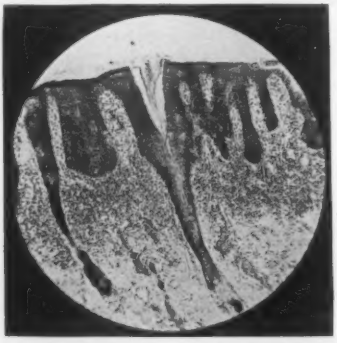

Fig. 3. Section of surface of tumor (high power), showing squamous epithelium, hair (H), and hair-root (H. r.).

visible on its surface. To the touch, the mass was boggy (see Fig. 1 "3").

An X-ray of the tumor did not reveal any bone or teeth.

*Microscopical Examination:* The whole tumor was sectioned through its longitudinal axis (see Fig. 2).

The surface of the tumor consists of a layer of skin and many layered squamous epithelium (see Figs. 2 and 3). Scattered over the entire epithelial surface one can see hair roots and hairs (see Fig. 3 "H").

Subjacent to the epidermal layer one can see sweat glands in several locations. The bulk of the tumor consists of fat and connective tissue. In certain sections of the tumor one can see cartilage, but no bone.

The best comment one can make on this interesting type of tumor is the quotation from Ewing (Neoplastic Diseases, W. B. Saunders, 1928): "The 'dermoids' are usually complex. They appear at birth or after some years, producing dysphagia or dyspnea. They are attached to the hard or soft palate, or wall or vault of the pharynx, in or near the middle line, and fill the nares or buccal cavity. Some may show an intracranial portion, connected through a perforation in the skull with the pharyngeal tumor.

"The tumors are covered with skin, often hairy and containing dermal glands. The main mass is composed largely of fat tissue, with occasional fragments of striated muscle, cartilage or bone."

Medico-Dental Building.

## OBSERVATIONS ON AGRANULOCYTOSIS.*†

DR. NATHAN ROSENTHAL, New York.

The importance of watching the changes in the blood picture associated with various kinds of ulcerations of the buccopharyngeal mucous membrane cannot be too strongly emphasized. Ordinary infections of the tonsils, such as follicular tonsillitis, or throat infections associated with necrotic lesions, streptococcic, diphtheric, or so-called Vincent's angina, are usually accompanied by an inflammatory reaction in the blood, namely, leukocytosis and polynucleosis. As the infection becomes more intense, the young polymorphonuclear neutrophils, or staff cells, appear (according to Schilling's[1] hemogram). In some cases, the leukocytosis does not occur even in the presence of an apparently severe infection of the throat, and the polymorphonuclear cells may be normal in number. A definite increase of the staff cells (Stabzellen), however, may usually be noted. Ulcerative, diphtheritic or necrotic lesions may appear in the throat, as secondary manifestations in the course of infectious lymphocytosis or infectious monocytosis (so-called monocytic angina of Schultz[2]), and in the various forms of leukemia. In these conditions the blood picture shows the characteristic findings of the underlying cause. These disturbances occasionally begin with a leukopenia, or show a leukopenia during the course of the disease. In infectious lymphocytosis, a leukocytosis occurs and the lymphocytes are greatly increased in number; in infectious monocytosis, there is a marked increase of the monocytes—these being the large mononculear and transitional cells of Ehrlich; in the leukemias, the presence of the premature myeloid cells, such as myelocytes, myeloblasts and lymphoblasts, is characteristic.

Recently, the name "agranulocytic angina" has been applied by Friedemann[3] to a symptom-complex which is characterized by necrotic manifestations in the mouth and throat, and profound diminution in the number of white blood cells, mainly affecting the polymophonuclear cells. This condition was first described by Schultz[4] in 1922, who chose the term "agranulocytosis" by way of indicating that ulcerative lesions in the mouth and throat may be absent. According

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to the first reports of this investigator[4] the main features of this unusual condition are:

1. Sudden onset with high fever and general malaise.

2. Ulcerations, necroses, diphtheritic or gangrenous processes, especially of the tonsils, pillars of the fauces, uvula, palate and pharynx; and occasionally similar lesions of the gums, tongue, larynx and genitals.

3. The absence of a hemorrhagic diathesis.

4. The presence of icterus.

5. Occasional enlargement of the liver and spleen.

6. Characteristic blood picture: A profound depression of the white blood cell count—usually less than 1,000, with a disappearance of the polymorphonuclear neutrophils. There is a relative lymphocytosis. The red blood cells and blood platelets are not disturbed.

7. Rapid fatal course.

Schultz[5], however, has lately modified his opinion and is now inclined to accept cases which do not show jaundice, and even some in which anemia is present. Recoveries have been noted by him in four cases. The disease is not necessarily fatal; it happens, in fact, that 13 per cent of the cases reported have recovered. Lauter[6] was the first to report a case which did not result fatally.

The following facts are among the high spots in the history of agranulocytic angina: Rotter[7] was the first to publish a case in a male patient. Kastlin[8] analyzed the findings in the first 43 cases observed and in two additional cases. Wyatt[9] called attention to 47 other cases in the literature and reported one of a woman, age 43 years, who made a complete spontaneous recovery. Recently, Rose and Houser[10] have again reviewed the subject from the standpoint of its infectious nature. In all, 200 cases have been reported, including 15 cases observed by the writer[11].

## SYMPTOMATOLOGY.

The onset is usually sudden, but occasionally there is a previous history of long-continued ill health, or of sore throat or influenza-like attacks; the patient complains of dysphagia, sore throat or dyspnea; the voice becomes peculiar, resembling the so-called "hot potato" type of peritonsillar abscess. Rarely are these manifestations of sore throat absent; prostration is intense and is frequently out of proportion to the extent of the lesions present in the throat. In a few of the cases observed, there has been no angina. Jaundice occurs in less than 50 per cent; it is sometimes terminal. Remissions occur.

Physical examination usually reveals ulcerations and necroses of the tonsils; similar lesions may appear in the pharynx, pillars, uvula, hard or soft palate, tongue or gums. Reports of a few cases occurring without ulcerative lesions have, however, appeared in the literature. The cervical nodes are usually enlarged; an edema may appear below the jaw or on one side of the neck. In one of our cases a terminal gas infection was present in the latter region. Hemorrhages from the ulcerated areas rarely occur; the liver and spleen may be palpable; ulcerations similar to those appearing in the mouth may be observed in the anal region, vulva and vagina. Various types of skin lesions have been described, such as erythema, herpes and maculopapular eruptions, such as may occur in any form of toxemia or septicemia. The urine shows the presence of albumin; urobilin and bile are present in jaundiced patients.

### BLOOD PICTURE.

Agranulocytosis assumes the aspect of an infectious disease with a characteristic blood picture. The hemoglobin and red blood cells are usually normal, although they may become somewhat subnormal during the course of the disease. The most important feature of the blood picture, however, is the extreme leukopenia—the white blood count varying from 100 to 5,000.

The differential count shows a disappearance of the polymorphonuclear neutrophils or a great diminution in their number. There is also a decrease in the lymphocytes. The plasma cells and monocytes may be increased. Macrophages, and even myeloblasts, may be found. The blood platelets are either normal in number or somewhat increased. In one of our cases there was a diminution in the number of blood platelets, as the disease progressed.

In favorable cases there is a prompt improvement in the blood picture. The young polymorphonuclear cells (staff cells) make their appearance when the leukocyte count begins to increase. The granules of the staff cells show peculiar staining reactions; they become rather dark and coarse. Later the normal neutrophilic granules appear, also mature segmented polymorphonuclears.

### BLOOD CULTURES.

Of the cases so far studied, a positive blood culture was obtained in only 28 of the 75 cases in which blood cultures were made. Due to this fact, and also because various types of organisms have been recovered in agranulocytic patients, this condition cannot be regarded as a specific infectious disease.

### AGE AND SEX.

The preponderance of agranulocytosis in middle-aged women, previously in good health, is a striking feature of the condition—only 24 cases having been reported in males up to the present time. This disease is rarely seen in persons under 20 years of age, although a few cases have been reported in children by Bantz[12], J. Weiss[13], Carran[14] and Christof[15].

### CLASSIFICATION OF AGRANULOCYTOSIS BASED ON OBSERVATIONS IN FIFTEEN OF AUTHOR'S CASES.

Group I: Agranulocytosis with fatal termination (8 cases).

Group II: Aleukocytic angina (1 case).

Group III: Agranulocytosis followed by recovery (5 cases).

Group IV: Agranulocytosis in which recovery was followed by persistent agranulocytosis (1 case).

In all of the cases just referred to—which will be reported in detail later—the main characteristic features of agranulocytosis were present, namely the leukopenia and the septic manifestations. In two cases there was no angina.

It is important to note that in the fatal cases there was complete absence of polynuclear cells, a leukocyte count below 1,000, and usually a positive blood culture. In cases with a negative blood culture and leukocyte count above 1,000, the prognosis is more favorable.

The differential diagnosis offers no difficulties, provided one is aware that secondary agranulocytosis and ulcerative manifestations may be terminal complications of aplastic anemia, leukemia (myeloid and lymphoid), Hodgkin's disease (Jaffee[16], Miller[17]) or, possibly, the result of X-ray or radium therapy or neosalvarsan or benzol poisoning. In this communication we are dealing only with true cases of agranulocytosis or Werner Schultz' disease (Chevalier[18]), or primary agranulocytosis.

### ETIOLOGY AND PATHOGENESIS.

Many views have been expressed in regard to the cause of agranulocytic angina. Based on the summaries of Schultz[5], Hueper[19], Rose and Hauser[10], the following resumé has been formulated in connection with the etiology:

*1.* The condition is a specific disease entity.

*2.* It is a granuloleukopoietic disorder of the bone marrow.

*3.* A specific selective toxic action of the bone marrow is present, making the body less resistant to secondary invasion of bacteria.

*4.* The disease is due to an infection on a pre-existing hypoplasia of the granulopoietic apparatus.

*5.* It is a malignant leukopenia of leukemic nature.

*6.* The condition is secondary to some endocrine influence.

*7.* It is an atypical form of sepsis.

The disease being an uncommon one, the majority of these views were apparently expressed by these writers after studying comparatively few cases. The present writer is inclined to accept a part of Schultz'[4] and a part of Friedemann's[3] views on the nature of this condition. Even these investigators have changed their own opinions occasionally. Schultz[4] recently suggested the possibility of a toxic action of some virus which has a special affinity for the myeloid system. From the study of 15 cases and the observation of a few others, however, the writer is inclined to the idea that agranulocytosis is a clinical entity, related in some instances to a constitutional hypoplasia of the leukopoietic system; in other cases it may be a result of transitory hypoplasia. It cannot be definitely assumed that, in the latter group, this hypoplasia is due to endocrine influences. The septic manifestations are of a secondary nature and produce pathological lesions which are common to septic conditions without the inflammatory reaction. The prognosis of the case depends upon the extent of the invasion of the bacteria. The bone marrow may recover before the septic manifestations have gone too far. In six of our cases which recovered, it seemed that the healing of the ulcerations started about the time the polynuclear leukocytes began to definitely increase in the blood.

*Treatment:* There is no specific treatment for this disease. Transfusions and intravenous injections of neosalvarsan are the most important procedures employed for the purpose of hastening recovery. Mild irradiation of the long bones has apparently produced satisfactory results in some cases, although, in two of the author's cases, and in some cases reported in literature, this form of therapy did not produce any immediate effect. Most of the cases recover spontaneously.

*Prognosis:* While 13 per cent of the cases previously reported have recovered, the percentage in cases observed by the writer has totaled 40 per cent.

## CONCLUSIONS.

*1.* Fifteen cases of agranulocytosis herewith reported have been observed, with a mortality of 60 per cent. Two other cases seen in consultation have recovered, and an additional case is known to have recovered from an attack 12 years ago.

*2.* The disease is a symptom-complex with two phases: *a.* a localized, ulcerative condition of the Waldeyer ring (tonsils, pharynx, pillars of the fauces, tongue, etc.), accompanied by symptoms of sepsis: *b.* an associated profound leukopenia affecting mainly the polynuclear neutrophils.

*3.* The leukopenia may be due, primarily, to a functional disturbance or a hypoplasia of the leukopoietic system; septic signs are probably secondary manifestations, resulting from the absence of the defensive mechanism of the body.

*4.* Hypoplasia of the bone marrow may be transitory, or it may possibly be the result of a permanent constitutional disturbance. Such patients are predisposed to the development of agranulocytosis.

*5.* Recovery is usually spontaneous, following re-establishment of the function of the bone marrow, provided the septic invasion is not too extensive.

*6.* There is no specific treatment.

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## COMPLICATIONS OF TONSILLECTOMY.*

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We may go along serenely in our operative work for a long time until some unforeseen complication arises and causes a prolonged and stormy convalescence.

Our peace of mind is upset and it is then that we take stock of ourselves and try to ascertain the causes leading to these sequelae.

Has some previous condition of the patient been overlooked? Is it due to some carelessness on the part of the anesthetist? Is our technique at fault? Is something wrong with the postoperative care? By asking these questions we might arrive at the cause by the process of elimination.

There are many physicians who, though skilled in the knowledge and operative technique of otolaryngology, attempt operations in this field, and ease their consciences with the thought that as the patient does not understand, no harm is evident.

On the other hand, well trained men with skill and experience are careless at times, especially after doing a few hundred operations with no after-effects.

We profit by the mistakes of others and are taught by our own. Criticism is often engendered by envy, but it is constructive criticism when we try to point out that bad results ensue from carelessness.

Within the last year a series of tonsillectomy complications prompted me to give this subject more study, and the result is as follows:

*Sudden death* at or immediately after operation is more frequent than one would suspect. I recall a colored child in the clinic, who had tonsils removed and was returned to a ward in which a few other cases were coming out of ether. The nurse left the room for a short time, and one of our doctors entered, and, on looking around, discovered this child was dead, less than 10 minutes after the operation.

Another case, while under ether suddenly became cyanotic, pulseless and heart ceased to beat. The operation was stopped and oxygen and stimulants restored it in a few hours. The tonsils were not removed, but the child was saved. An X-ray of the chest showed an enlarged thymus.

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An unusual case of death soon after operation was reported by Mielke. A local tonsillectomy was done on a woman, age 44 years. She soon passed into a state of shock, and died within 24 hours. The autopsy revealed a nodulous gummatous liver, and the operation may have liberated toxins from the gummata on the same principle as a Herxheimer reaction.

Bailey, on summarizing a series of questionnaires, reports that one in every 13 operators had one or more deaths, or about one death to 1,400 cases.

Another case of death in a girl, age 20 years, was reported by Husik. After an injection of 4 c.c. of one-half per cent novocain with two drops of 1:000 adernalin through the anterior pillar back of the capsule, patient became greatly excited and the tonsil was quickly removed. Short clonic convulsions, with rigidity, came on in 1½ minutes after the injection. This was followed by cyanosis, feeble pulse, shallow respirations and unconsciousness. Then she became more quiet, but spasm returned on being touched. She died within four minutes after injection.

The novocain was analyzed and found normal. The autopsy revealed an enlarged thymus, in anterior mediastium, early arteriosclerosis and hypoplasia of heart and aorta, and chronic lymphadenitis.

He also recalls two other deaths in children under 4 years of age, who apparently recovered from the anesthesia, but suddenly became cyanotic and died soon afterward. The death certificate showed status lymphaticus in both.

In the Massachusetts General Hospital the routine is to X-ray all children before operation, and 7½ per cent of cases showed a positive thymus.

In 15,000 cases Martin found six deaths over a period of six years: anesthesia, 2; bronchopneumonia, 3; sepsis, 1.

Lott reviewed 1,000 cases and quotes a number of anesthesia deaths. He cautions against too much or too concentrated anesthetics.

Quoting the words of Dr. Jackson: "The cough reflex is the watchdog of the lungs", and its total abolition is dangerous.

Five thousand questionnaires were sent to physicians by Hanau W. Loeb, and 332 replied that each had one or more fatalities, in all types of operations on the nose and throat not dependent on anesthesia.

Meningitis caused 125 deaths. Of these, four were after removal of tonsils and one after adenoidectomy where symptoms developed

after 48 hours. The few deaths from general sepsis were nearly all after tonsillectomy.

*Hemorrhage* occupies the major portion of the literature. Though much has been written on this subject, it seems proper to bring it up at intervals, merely to keep it constantly in mind when we operate.

*Blood Supply—Arteries:* Descending palatine branch of internal maxillary to superior pole. Ascending palatine and tonsillar branches of facial to middle and external poles. Ascending pharyngeal and dorsalis lingue to lower fossa. *Veins:* Tonsillar plexus beneath the capsule and superior constrictor muscle drains into internal maxillary veins above, ranine vein anteriorly and palatine vein below. At the lower pole posteriorly the plexus form a large vein, which joins the pharyngeal plexus or opens into the jugular vein. This accounts for persistent oozing in this area.

The causes of tonsillar hemorrhage are classified by Morowitz as follows: Anomalous blood supply, traumatism to pillars, menstruation and pregnancy, arteriosclerosis, acute tonsillitis, fibrous tonsils, acute infectious diseases, active syphilis, hemophilia and sloughing of vessel walls from low-grade infections.

Most blood is lost by young healthy males between 18 and 35 years. Least bleeding in slender women between 30 and 60 years. Most bleeding from muscles in upper part of tonsillar fossa.

In 417 operations, he states there was bleeding in 25 cases, or 6 per cent; 18 adults and seven children. The major portion of hemorrhages was at time of operation, and mostly due to injury of pillars and to leaving a small piece of tonsillar tissue.

*Status lymphaticus* may be diganosed by large tonsils and adenoids, large cervical glands and a waxy pallor. These cases should be especially watched as they do not take ether well, and may die up to 36 hours after operation.

*Infections* are usually more severe in adults. The bacteria penetrate the surface epithelium and lodge in the crypts, and where tonsils are imbedded the pillars interfere with drainage and this causes more trouble.

Brooks writes that the efferent lymphatics from the tonsil drain into the middle of the superior deep cervical lymph nodes. The gland behind the angle of the jaw beneath the sternocleidomastoid muscle is called the tonsillar lymph node because of enlargement in tonsillar infections.

Ballenger and Dickie have reported a small number of postoperative cases of cervical adenitis, cellulitis of neck and general asepsis. Their percentage seems low. They attribute these cases to: Opera-

tions during acute inflammation, carious teeth and bloody and exposed wound acting as a culture medium.

*Retropharyngeal abscess* may develop in cases who have had frequent attacks of quinsy previously.

Three weeks after an attack of quinsy I removed a man's tonsils. Ten days later his throat was inflamed, deglutition was painful and postnasal space became occluded. He was readmitted to the hospital, and with head down and in a recumbent posture, the abscess was opened and drained and recovery was uneventful.

We all meet cases who have developed abscesses of this type as well as abscesses behind the pillars. The latter may be due to needle infection or to a remnant of tonsil tissue being left.

*Acute otitis media,* both serous and purulent, is seen more in cases with previous histories of ear infections. The adenoid curette may scrape the ostium of the Eustachian tube and carry infection upwards. Rough instrumentation and carelessness also contributes to this condition. Large tonsils leave exposed surfaces and these cases complain of earache for a few days. This clears up with no after-effects.

*Tuberculosis* should be guarded against and a careful physical examination should be made in every case. Operations should not be done, as a rule, in active or arrested cases and especially if there is laryngeal involvement. Nussbaum cites a case of a young man with the disease arrested, and it flared up again when the tonsils were removed.

*Bronchopneumonia and lung abscess* are very important involvements and it would take more time than I am allowed in this paper, so I can only state that recent literature is very complete on this topic and one can refer to it.

*Vincent's angina:* Tucker reports 41 cases where operation was done during the attack and all quickly recovered except one case, in which the infection spread to the soft palate with subsequent deformity and scarring and a seven weeks' stay in the hospital. He further reviews 2,500 cases with following complications: Cellulitis of neck, one; paresis of soft palate, one; abscess of soft palate, one; acute otitis media, three; acute laryngitis, three; peritonsillar abscess, two.

Van Poole describes two cases of Vincent's angina which developed three days after operation. One was treated with neosalvarsan locally and intravenously and recovered, though the uvula was destroyed. The other was treated with 1 per cent brilliant green and crystal violet in 50 per cent alcohol and quickly recovered with no deformity. Sloughing of tissues later on may cause bleeding.

Tibbets writes about five cases of Vincent's angina, one bleeding five hours after operation and the others two to seven days later. All complained of sore throat before bleeding commenced. Hemorrhage came on suddenly and clots formed, but bleeding continued beneath the clots until it was checked.

*Ludwig's angina* is described by Leatherwood. It occurred six days after operation, with symptoms of inflamed throat, mediastinal tumor and general sepsis.

*Local anesthesia* has caused infections by infiltration around the tonsil and by the needle puncture. The infection is deep-seated and of long duration. A sudden rise of temperature, which persists, with local signs of general infection, will, in two or three days, give warning of a systemic infection and if patient recovers, the convalescence is prolonged for months. Positive blood cultures make the diagnosis. Ballenger treated a physician for septicemia coming on after tonsillectomy and he took six months to get well.

*Meningitis* has been referred to. Jacobson had a patient suffering from chronic tonsillitis with frequent attacks of angina, and with rheumatism of seven weeks' duration. After removal of tonsils, temperature rose and in five weeks meningitis developed and he died one week later.

The rare infections after tonsillectomy are mentioned here because they have occurred: Erysipelas, diphtheria, scarlet fever, poliomyelitis.

*An hematoma of the soft tissues of the throat requiring a tracheotomy* is described by Schall. Two hours after a local operation, there was an ecchymosis of anterior pillars with bleeding and clot formation. Nitrous oxid was given, breathing stopped and a tracheotomy was performed, and operation was finished under ether administered through the tube. There was much swelling of soft tissues, uvula and oropharynx. All landmarks were obliterated. Thromboplastin was used and oozing ceased. The vessel walls opened and there was hemorrhage into the muscles due to rise of blood pressure when gas anesthesia was given.

Rosenbaum did a local tonsillectomy on a woman, age 35 years. In 10 minutes the eyelids, face and neck were emphysematous, with an eggshell-crackle feeling. There was no discomfort and it cleared up in three days. Edema of the glottis and uvula occur often, but aside from discomfort it is not serious.

In passing I may mention some rarer noninfectious complications: Spastic laryngitis, torticollis, facial palsy and angioneurotic edema.

*End-Results:* Richardson believes that even well performed tonsillectomies may cause: *A*. New tissues growth behind the palatopharyngeal fold. *B*. Hypertrophy around edges of lingual tonsil.

Two years after operation three cases had new lymphoid tissue behind the posterior pillars and six cases with new tonsillar tissue at the base of the fossa moving with the tongue when it was depressed.

Lymphatic nodules may form years later, due to new growth of granular or true tonsillar tissue, and parents become indignant because the tonsils were not completely removed.

Injuries shorten anterior pillars. Adhesions pull them to base of tongue and the lower wall of the fossa to the side of the tongue. Scars around the fossa of Rosenmüller may occlude the Eustachian tube and we get tinnitus and a nasal voice.

Rice believes that removal of tonsils produces a severe grade of dry pharyngeal catarrh, especially in the postnasal region. Moist mucous membrane is replaced by scar tissue and the surface dryness extends from the vault to the larynx and trachea. Speech is affected and it especially affects the singer.

As the larynx becomes affected, the vocal cords may become dry and less flaccid. Mucus may collect and there is a break in the voice with a resulting hacking habit. Later the arytenoids are enlarged, cords are thickened and nodules form, due to irritation of one cord against the other. Singers call them "corns". The voice becomes deeper and the process may extend to cause catarrhal otitis media.

Sir James Dundas Grant also hesitates about operations on singers. Scar tissue fixes the soft palate with escape of breath behind it. When pillars are injured or cut away, the soft palate is pulled forward and food and drink may pass into postnasal space. The uvula may be pulled to one side and at times is entirely removed by the snare, even by good operators, with embarrassment later on.

Mann states that sinus disease and other respiratory conditions are more common in children whose tonsils and adenoids were removed. He proves that lack of Vitamin A may produce sinus and respiratory diseases, due to lowered resistance. If progress after operation is not satisfactory, he prescribes a diet rich in Vitamin A to hasten the cure.

The Eskimos, of Labrador, are the only people without large tonsils. Their food is salt fish and blubber. The tonsils are only lymph spaces between the pillars.

Three years after operation, Moorman tabulated results in 403 cases as follows:

*Throat:* Improved, 48.4 per cent; unimproved, 45.4 per cent; worse, 6.1 per cent. *General Condition:* Improved, 37.7 per cent; unimproved, 45.6 per cent; worse, 16.6 per cent. Tonsil tissue left, 12 per cent. Second operation done, 2 per cent. Results can't be tabulated, due to the inability to follow up cases.

Wagers classifies 247 cases as follows: Group 1, up to 11 years, 143. Group 2, up to 25 years, 90. Group 3, over 25 years, 41. Questionnaires were sent to all one year later and there were 84 replies: Group 1: Improved, 39; unimproved, 7; replies, 46. Group 2: Improved, 14; unimproved, 9; replies, 23. Group 3: Improved, 10; unimproved, 5; replies, 15.

## CONCLUSIONS.

Tonsillectomy should be considered a major operation.

A complete history should be taken, especially inquiring about hemophilia, jaundice, purpura, anemia and diabetes.

A thorough physical examination should be made, with emphasis on the nose and throat.

Give plenty of time for rhinitis, tonsillitis, oral abscesses and quinsy to clear up before operation.

If possible postpone operation when epidemics prevail.

Take coagulation time, though the tests differ in the laboratory from actual results at operation.

In the lymphatic type get X-ray of chest for possible thymus condition. This is now a routine in some hospitals.

The operator should be competent and have knowledge of the anatomy of the nose and throat.

The operation should not be done in the office, but in a hospital because of better facilities.

The anesthetist should be competent.

Multiple operations at one time, such as a submucous resection and a tonsillectomy, should not be done as it is considered poor surgical procedure.

Most hemorrhages occur at operation, due to injuries to pillars and muscles and failure to stop oozing. Never remove a second tonsil before bleeding has stopped in the first. Guard against needle infection in local operations.

Make sure that the solution and the percentage used for injections is correct.

Not every man is a hero to his valet; neither is every operator a skillful surgeon to his interne.

Many a tonsillectomy done very quickly and with a flourish before an admiring audience in the operating room routs the interne from

his bed that night to stop a hemorrhage, which could have been avoided if a few more minutes and a little more care were taken at operation.

Postoperative care should be in expert hands. It is often given in private cases, but sometimes neglected in clinic cases. A trained nurse should be with the patient from the time he leaves the operating room until he comes out of ether. She should watch for hemorrhage, and as blood may be swallowed the vomitus should be examined.

"A better surgeon is needed for after-treatment than before operation."—Loeb.

Where deaths occur, autopsies should be done and the histories and records of findings should be complete.

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## UNUSUAL LARYNGOLOGICAL CONDITIONS.*†

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In presenting a group of unusual laryngological conditions by means of lantern slides, I realize that the various cases I am presenting have nothing in common other than the fact that they are unusual, and it is difficult for one to appreciate this group of cases without the lantern slides. Reports of all of these groups have been published elsewhere, and reference to the bibliography will allow more detailed consideration of each group than is possible in this type of presentation.

*Primary Blastomycosis of the Larynx:* In this group are three cases of blastomycosis of the larynx. This condition is unusual, and is frequently taken for primary tuberculosis of the larynx. Clinically, the lesion is grayish, nodular, inflammatory and infiltrating, and the mucous membrane appears as if it had been touched with silver nitrate. Microscopically, multiple abscesses are found, and also a condition that simulates tuberculosis. If the microscopic field is shaded, the blastomyces will be seen in the center of the abscess. I believe that when this condition becomes more generally known many chronic inflammatory, laryngeal lesions of indeterminate cause may turn out to be primary blastomycosis of the larynx.

*Pharyngeal Sinus Associated with Cervical Pott's Disease:* This group of cases is particularly interesting because the patients present themselves to the laryngologist rather than to the orthopedist or general diagnostician. The chief complaint is the discharging pharyngeal sinus. On examination, the sinus is seen on the lateral aspect. When it is injected with lipiodol, destruction of an upper cervical vertebra is readily demonstrated in the Roentgenogram. These patients frequently present an external sinus, which may be bilateral, either anterior or posterior to the sternocleidomastoid muscle. It is essential that a definite diagnosis be established, and that the patients receive careful treatment. In one of my cases, the seventh cervical vertebra was involved, and the sinus ruptured into the esophagus, causing an esophageal as well as a cervical fistula. The first and second cervical vertebrae were involved in two cases; the second and third in one case; the third and fourth in one case; the fourth in one case; and the seventh in one case.

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*Congenital Atresia of the Posterior Choanae:* The next unusual case to be presented is that of an infant who was brought to the clinic because he was unable to take feedings or to sleep on account of the fact that the tongue sucked back against the pharynx, and if food was taken it was blown out with expiration. It was found that by slipping a catheter into the hypopharynx the child was able to take the bottle and to breathe normally. A piece of celluloid was shaped to the size of a catheter and, with a crosspiece at the distal end to prevent it from getting into the pharynx, it was inserted instead of the catheter. This allowed the child to take its feedings from a bottle and to sleep normally. It was necessary to continue using this apparatus for six months to a year, when it was withdrawn gradually, and the child continued to gain and to do well. As the child becomes older, it will be necessary to make an opening into either posterior choana, and by means of a rubber tube, to establish a normal opening. It is best not to attempt this, however, until the child is able to co-operate.

*Stricture of the Hypopharynx:* The next case is that of a man, age 28 years, who came to the clinic with a stricture of the hypopharynx caused by lye, which produced complete atresia except for a minute opening in the region just above the epiglottis. Before the patient came to the clinic, his home physician had found it necessary to open his trachea on account of the obstruction. Later, gastrostomy was done, in order to administer food. While the patient was undergoing treatment in the clinic influenza developed, and later empyema. Therefore, at one time he had three tubes in place: one tracheotomy tube, one gastrostomy tube and one tube to drain the empyema. The stricture was removed and, later, repeated dilation was carried out. The patient ultimately got so that he could dilate the stricture with his finger. Eventually he was able to dispose of all three tubes.

*Nasopharyngeal Malignancy with a Syndrome Characteristic of Involvement of the Nerves Which Pass Through the Jugular Foramen:* This case is presented simply to bring out the fact that about 25 per cent of the patients with nasopharyngeal malignant conditions primarily consult the neurologist, and that only about 40 per cent of them consult a laryngologist with the symptoms that are usually thought to be associated with such a condition. The case presented exemplifies the enophthalmos with a small, palpable fissure, the paralysis of half of the palate, tongue and pharynx, the vocal cord in the cadaveric position, and paralysis of the trapezius muscle. There was involvement of the ninth, tenth, eleventh and twelfth nerves and the sympathetic nerves. From a diagnostic point of view, this group is particularly instructive. Irradiation is the only treat-

ment of value and, in the highly malignant tumors, frequently accomplishes a great deal. Some patients have been well seven or eight years after irradiation.

*Mixed Tumors of the Pharynx:* These tumors, if they are movable, should be treated surgically. Frequently they are in the pharynx or palate; sometimes they fill the entire oropharynx and present at the angle of the jaw and in the submaxillary region, as shown in the case presented. The large tumor in this case was removed through a submaxillary incision; smaller tumors are better approached through the mouth. Preliminary ligation of the external carotid artery usually is advisable. The prognosis in these cases is good, for the tumors are of a slowly growing type, are usually well encapsulated and are readily shelled out.

*Lymphangioma of the Tongue:* This case, that of a girl, age 16 years, is presented to show the value of irradiation in lymphangiomas of the tongue. This extensive tumor, about 7.5 c.m. long and 5 c.m. wide, bulged out of the mouth, and flattened the lower anterior teeth. Following irradiation this tumor gradually shrank, so that it was possible to see the teeth, and the patient was able to get her tongue back into the mouth for the first time in her life. The molar teeth were approximated, whereas the teeth anterior to them were markedly separated, because the tumor prevented them from coming together. The use of radium is specific in the treatment of lymphangiomas and angiomas in young children. In older patients, the application of surgical diathermy by means of a protected vulcanite point is preferable.

*Lipoma of the Pharynx:* In this case the patient presented a large lipoma of the pharynx. It was necessary first to open the trachea, and then to remove the tumor by means of lateral pharyngotomy. This is the only case of such a tumor in this situation that has been observed in the clinic. There are only about 35 cases reported in the literature.

*Fibrosarcoma of the Hypopharynx:* In this case there was an extensive fibrosarcoma, which almost filled the hypopharynx, and apparently originated from the pyriform fossa. It was necessary, first, to open the trachea and following this the tumor was removed by means of radium seeds introduced directly into the tumor. About two years later the patient shows the absence of the tumor and closure of the tracheal fistula. In another case there was a much larger tumor of a similar nature, almost completely filling the pharynx and hypopharynx. The Roentgenogram gave clear evidence of the extent of the tumor. These cases are treated in a manner similar to that described in treatment of the mixed tumors. If possible, they are

shelled out through the mouth. The larger tumors are removed by means of lateral pharyngotomy. It was necessary, in this case, to do preliminary tracheotomy and then to remove the tumor by means of lateral pharyngotomy.

*Fibroma of the Epiglottis:* The next case is that of a boy with a fibroma on the posterior surface of the epiglottis, almost completely filling the hypopharynx. It was necessary, first, to open the trachea and then to destroy the tumor with surgical diathermy; I felt that this would be the better way of treating it on account of possible destruction of the epiglottis if irradiation were used. The tumor entirely disappeared.

*Amyloid Tumors of the Larynx:* These tumors are unusual and they are frequently overlooked. At the present time I have a patient in the hospital in whom such a tumor involves the entire subglottic region, and almost completely obstructs the larynx, so that it has been necessary to open the trachea. The three cases presented here are of a similar nature. The treatment is not as satisfactory as it might be, especially if the tumor involves the entire circumference of the larynx. Roentgen rays and radium have been used in some of these cases, and considerable improvement has resulted. If the tumor is localized it should be removed surgically. If the tumor is diffuse, involving the entire circumference of the larynx, complete removal may result in secondary stricture. In this type of case, treatment should be conservative.

*Chondroma of the Larynx:* In the last year I have observed two patients with chondroma of the larynx. One tumor was situated on the posterior wall of the cricoid cartilage; it was possible to remove it by means of thyrotomy. The other tumor was more extensive, involving both the thyroid and cricoid cartilages, but it was possible to shell it from its bed and to remove it surgically. The mortality in chondromas of the larynx reported in the literature is unusually high, due to the fact that a conservative operation is attempted, and then the growth is found to be much larger than it was thought to be. The prognosis in chondromas of the larynx depends entirely on the type of pathologic changes present. Some of the tumors change into active malignant growths, whereas the benign growths give no further trouble.

*Carcinoma of the Larynx in the Young:* This is an unusual condition. I have seen three patients within the last two years, under 24 years of age. It was necessary to do laryngectomy on two of the patients, and on one patient it was possible to do thyrotomy and to destroy the lesion with surgical diathermy. In these cases it is usually best to do an operation in two stages, and then to do thy-

rotomy, to see if it is possible to remove the tumor in a conservative way. At this time the laryngectomy may be done, if it is found to be the only treatment that will entirely eradicate the growth. These patients, thus far, have had no recurrence of growths. The first patient, however, underwent operation only about two years ago.

*Cystic Hygromas of the Neck in Children:* These tumors are somewhat rare, and in the past have been difficult to treat. Usually the patients are brought to the laryngologist because the mother feels that the tongue and floor of the mouth are getting larger. The condition is usually found in the submental, submaxillary and cervical regions. Years ago such patients were operated on and, on account of the multilocular, cystic nature of the tumors, there was frequently a recurrence. Now, by the use of radium, these tumors are reduced in size, and in many cases disappear entirely. Sometimes it may become necessary to remove a small, scarred mass, which is the remnant of the original tumor. In this way the problem of surgical care, in these cases, has been done away with and the results are more satisfactory.

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Mayo Clinic.

## MISLEADING BLOOD WASSERMANN REACTIONS.*

Dr. V. K. Hart, Charlotte, N. C.

There is a tendency to depend too greatly on a blood Wassermann reaction. These facts, though long ago demonstrated clinically, tend to be forgotten: *1.* A gumma may resemble malignancy. *2.* A positive Wassermann does not mean of necessity that a tumor is a gumma. Malignancy and tuberculosis may coexist with the syphilis. *3.* Central nervous system lues may exist despite a negative blood Wassermann and absence of other signs. *4.* A tertiary intracranial lesion may simulate a brain tumor.

These principles are demonstrated, respectively, by the cases here appended.

*Case 1:* White male, age 63 years, presented himself, Dec. 28, 1929, complaining of blocked nose. Examination disclosed a large circumscribed, somewhat indurated ulcer of the left inferior turbinate. A biopsy was done immediately (malignancy was suspicioned). The pathologist returned an unequivocal diagnosis of lues. Subsequent Wassermanns and precipitation tests were all strongly positive. He was referred to a syphilographer for treatment and complete recovery followed.

Case 2 illustrates the coexistence of frank syphilis and malignancy.

*Case 2:* Colored male, age 48 years, was first seen April 5, 1929, complaining of swelling of the right eye. There was frank exophthalmos without fixation. Vision, right, 20/200; left, 20/20. Ophthalmoscopic findings negative. A nodular growth was felt above the right eye along the inner margin. The X-ray report was, "Both frontals are densely clouded throughout. The outline of the right frontal is very indistinct. Ethmoids: All cell outlines are obliterated, indicating some involvement of the bony structures. Antra: Both antra have a small cyst in the lower portion." The blood Wassermann was returned 4 plus (a later spinal fluid was also 4 plus in all dilutions). A tentative diagnosis of a tertiary lesion was of course made.

After six weeks of treatment the pain was severe, vision in the right eye had regressed to light perception only, and a second X-ray report was, "There is a marked advancement of the pathologic

*From the Charlotte Eye, Ear and Throat Hospital.

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process in all the sinuses. The bony outlines of all are markedly eroded with the wall as of the right orbit and the clinoid processes. These plates are suggestive of a malignancy along with a luetic condition."

Biopsy was at once done under local anesthesia from right, inner, orbital margin. The pathologic report was, "Epidermoid carcinoma showing widespread lymphatic extensions. Probably primary in accessory nasal sinus."

The patient died a few weeks thereafter.

Case 3 was most interesting. A central nervous system lues was almost overlooked as the cause for his deafness.

*Case 3:* Male, white, age 28 years, presented himself on Jan. 4, 1930, complaining of deafness. The onset had been sudden, with no middle ear history whatsoever, and had incapacitated him for his work as a grocery clerk. The findings were:

| | *Right* | *Left* |
|---|---|---|
| Minimal caloric | No response | No response |
| Bone conduction | Short 40 seconds | Short 40 seconds |
| C4 (by air) | 0 | 0 |
| Big C (by air) | 0 | 0 |
| Spoken voice | Loud noise only at ear | Loud sentences at ear |
| Galvanic | No reaction | Slight residual irritability and slight nystagmus. |

"The septum is much deflected to the right. Antra are a little dark, but the right washes clear. There is a large red mass of adenoid tissue in the nasopharynx. Larynx is O. K. Tonsils are large, red and diseased. Has paper-thin drums. There are no gross central nervous system signs or symptoms."

A detailed caloric and turning tests gave all reactions essentially absent. The summary was, "Diffuse bilateral end-organ lesion or neuritis of the eighth nerve."

The slight residual activity of the left nerve with the galvanic was interesting as it offered some hope from treatment. However, what treatment? As a precaution the patient was at once put on yellow iodid of mercury, and a Wassermann taken. When the latter was reported negative it was felt that the condition might possibly be a nonspecific toxic neuritis. Dental X-rays were negative. Therefore, the tonsils and adenoid tissue were at once removed under local.

No improvement followed, and it was felt there must be some central nervous system pathology. A lumbar puncture was done and the spinal fluid Wassermann returned as 4 plus in all dilutions, with other findings negative. The situation was at once clear and he was referred for treatment, though caution was given as to a

Herxheimer reaction. Such might have destroyed the little residual function of the left eighth nerve.

Two months after antiluetic treatment the ear tests were:

| | *Right* | *Left* |
|---|---|---|
| Bone conduction | Short 45 seconds | Short 20 seconds |
| Big C (by air) | 0 | 0 |
| C4 (by air) | 0 | Short 20 seconds |
| Whispered voice | 0 | At ear |
| Spoken voice | 0 | 6 inches |

This was a distinct improvement in the left ear, justified treatment and bore out the galvanic prognosis.

A tentative diagnosis of brain tumor had already been made in Case 4 before the true diagnosis was reached.

*Case 4:* White, male, age 28 years, was referred for examination on Jan. 8, 1930, because of severe headaches. Examination: Eyes: OD, 20/70; OS, 20/30. Bilateral papilledema. Variable nystagmus, rotary part of the time and horizontal part of the time, right and left on extreme abduction. Fields showed complete right homonymous hemianopsia. Nose and throat, negative except for chronically diseased tonsils. Ears, functional hearing tests negative except for slight bilateral shortening of bone conduction and $C^4$ fork by air. The report of the vestibular tests was, "The reactions are within the bounds of normal. There is, from an otological standpoint, no evidence of tumor."

X-rays, stereo of skull: "The pituitary fossa is normal. There seems to be some very slight rarefaction of the bones along the suture between the frontal and parietal bones on the left. No definite pathology, however. Sinuses: Frontals negative. Ethmoids very slightly clouded on both sides, probably a thickening. Antra: There is a cyst in each antrum, apparently attached to the floor on each side. Sphenoids negative. The pineal gland is within normal limits."

Blood Wassermann was 2 plus with fortified antigen, but negative with the alcoholic. The spinal fluid Wassermann was 4 plus and in 1 c.c. amount and there was a slight change in the colloidal mastic, though the cell count was normal. Pressure was much increased.

Naturally, it was at first opined that the lesion was a nonspecific intracranial tumor somewhere along the left occipital tract. However, the neurologist's report was negative except for the eye findings. Furthermore, the spinal fluid Wassermann pointed to a central nervous system lues.

He was at once referred for treatment. Two months after such, the eye fields and vision were improved, and the headaches much

better. Hence, there was probably a tertiary lesion somewhere along the left optic tract.

*Summary:* *1.* Biopsy is indicated in lesions of uncertain nature. Particularly is this true if a tumor diagnosed as gumma does not improve after a few weeks' intensive treatment. *2.* Spinal puncture should always be done in cranial nerve disturbances of obscure origin. *3.* Failure to do so may rob the patient of essential treatment. Such, in time, with a central nervous system lues may mean much to hearing or eyesight.

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## BOOK REVIEW.

**A Manual of Otology.** By Gorham Bacon, A.B., M.D., F.A.C.S., Consulting Surgeon, New York Eye and Ear Infirmary, etc.; and Truman Laurance Saunders, A.B., M.D., F.A.C.S., Assistant Professor of Laryngology and Otology, College of Physicians and Surgeon, Columbia University, New York. Eighth edition, thoroughly revised, with 192 illustrations and two plates. Philadelphia: Lea & Febiger, 1928. Price $4.50 net.

This is the eighth edition of a small manual which has made an enviable place in the libraries of both the student and the specialist. This latest edition has been deleted of old-fashioned remedies and has been brought up-to-date a detailed account of newer measures. It is rather interesting to note that the authors felt that they could safely omit in this edition the description of operations for removal of tonsils and adenoids and for resection of the nasal septum. This omission may receive unfavorable comment from readers who need additional textbook technique in these operations, but otolaryngologists will readily agree that a textbook knowledge of these operations is not sufficient and that real technique is only acquired in the operating room.

The electric audiometer is fully described and many of the newer therapeutic measures in otolaryngology are carefully presented.

The anatomy and physiology of the parts are briefly presented and most of the commoner diseases are tabulated in classified groups.

The book is freely illustrated and contains numerous charts and prescriptions. M. F.

## SINUS DISEASE AND CHRONIC COUGH.

Dr. J. V. Cassady, South Bend, Ind.

Bronchiectasis, chronic bronchitis, asthma and similar diseases are so often associated with sinus pathology and improved by sinus treatment that the accompanying report of a series of cases may be of interest. Sinuses may not play such an important part in systemic diseases but interference with ventilation and drainage of the sinuses by polyps and purulent inflammation, even though allergic reactions, aggravates the cough and makes the patient uncomfortable. Removal of the polyps, drainage and ventilation of the sinuses in a quiescent period of the reaction removes a source of focal infection, postnasal drainage and irritative lesions that are the site of infection and temporarily, and occasionally permanently, relieves the allergic phenomena. It is very debatable whether asthma and bronchitis are ever other than allergic diseases but, granting that they are, the secondary invasion by bacteria of the sinuses, the reaction of the catarrhal and purulent tissues of the sinuses continues the irritation after the allergic offender is no longer active. During the acute stage ephedrin locally may help to relieve the symptoms but is in no sense a cure for the disease. In the chronic state, when bacterial invasion has occurred or permanent pathologic changes, such as hyperlasia, polyps and purulent inflammations remain, the tendency to recurring colds, the focal infections from poor ventilation and drainage are important trigger factors in setting off more allergic phenomena which result in a continuation of the disease with its resultant coughing. The susceptibility to colds brings them to the otolaryngologist for relief and accounts for the large number operated for sinus infection.

Rackeman-Tobey[2] reported 28 per cent of their patients with asthma giving a history of operation on the nose and throat. Their conclusions were that foci of infection bore little relation to the outcome of asthma and that local lesions of the nose and throat may develop from the same fundamental cause as the asthma itself and be part of the pathologic process of the disease. Since Voltilini[3] reported a cure of asthma following removal of a nasal polyp, the literature has held conflicting opinions about the advantages of nasal and sinus treatment in cases of chronic bronchitis and asthma.

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While Piness[1], in 1925, found 49 per cent of his 834 patients had had operations on the nose and throat which had not been successful, in 1929 he[4] advocated surgical treatment to remove the sequelae of allergic disease and in certain instances to remove foci of infection.

In a series of cases which I intend to report soon with mucosal hyperplasia, polyp formation and purulent sinus disease, untreated

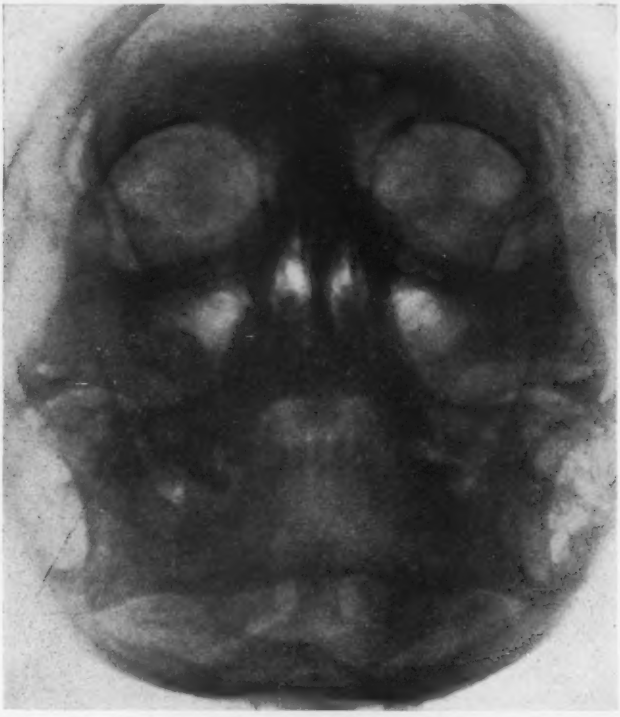

Fig. 1 (Case 1, F. M. J.). Hyperplastic maxillary sinusitis. Absence right frontal.

but observed over a period of time, the tendency to colds, the local irritative symptoms and the progress of the disease makes these patients more sensitive to allergic reactions than normal individuals, and in those cases which have had allergic phenomena, the presence of diseased tissue in the sinuses plus infection make them more susceptible to a recurrence or continuation of their reaction. I am not advocating the treatment of sinus disease as a cure-all for asthma

and chronic bronchitis but I believe that we should take the position that although allergic reactions may cause mucosal hyperplasia in the sinuses, the resultant obstruction to ventilation and drainage with secondary infection should be relieved as one of the factors in the efficient handling of bronchiectasis, chronic bronchitis and asthma if possible.

In the following cases, a careful history, physical examination and in nearly all X-ray examinations of the sinuses and lungs were used for diagnosis. Acute respiratory infection and allergic reactions were excluded. The duration of the symptoms varied from five

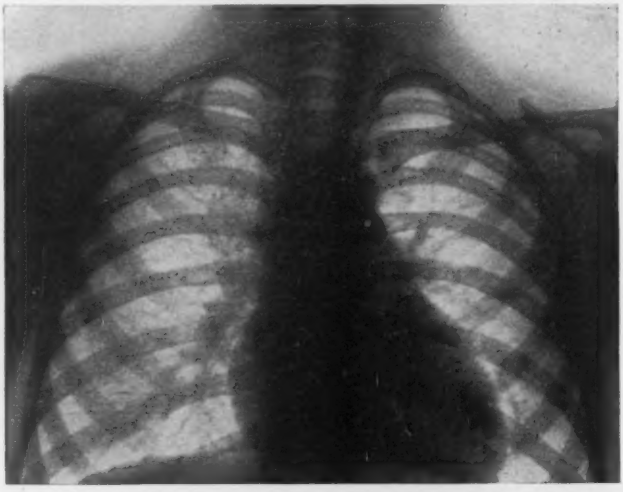

Fig. 2 (Case 1, F. M. J.). Fibroses of peribronchial region. Small calcifications.

weeks to years. Bronchiectasis was only diagnosed by lipiodol pneumonography, and hyperplastic sinusitis was in most instances checked with contrast material in the lumen of the sinus. An associated sinus infection was found in the following cases that came for relief of their cough: Chronic bronchitis, 58; bronchiectasis, 5; asthma, 5; asthma and bronchiectasis, 6; asthma and chronic bronchitis, 3.

Sinus infection was present in all of these cases but in 12 cases we were unable to determine which sinus was responsible. One patient had atrophic rhinitis. Approximately the same number had purulent sinus diseases as had hyperplastic. The purulent maxillary sinuses were in the majority and not the hyperplastic ethmoids so

often seen in the allergic diseases: Purulent: Pansinus, 5; ethmoid and sphenoid, 5; maxillary, 23. Hyperplastic: Pansinus, 5; ethmoid and sphenoid, 13; maxillary, 13.

It was impossible to follow all of these cases to their termination: 23 of them refused operation or sufficient treatment to affect the sinus pathology. The improvement refers to the cough. One who had an unrecognized tuberculosis failed to show improvement. The

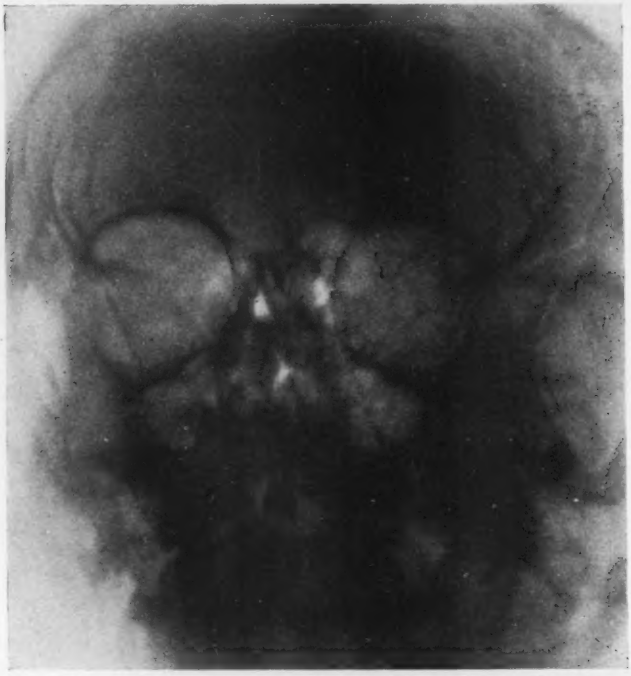

Fig. 3 (Case 2, M. O., Feb. 21, 1930). Cloudiness, antra and ethmoids.

asthma patients sensitive to some allergen were the most difficult ones to treat. The recurrence of polyps and the involvement of the frontal sinuses were stubborn factors in these cases. The bronchiectasis cases, although not cured, had a subsidence of their cough and in two cases have not had a return of it since surgery of their sinuses over two years ago. As a rule children with purulent sinus infection and chronic bronchitis respond to treatment better than adults.

CHART I.

| | Improved | Complete Subsidence | Not Followed Through |
|---|---|---|---|
| Chronic Bronchitis | 26 | 7 | 23 |
| Bronchiectasis | 2 | 1 | 2 |
| Asthma | 1 | 0 | 4 |
| Bronchiectasis and Asthma | 2 | 0 | 2 |
| Chronic Bronchitis and Asthma | 4 | 1 | 3 |

*Case Histories:* F. M. J., age 58 years. Two years ago had whooping cough, since then wheezing and severe paroxysms of coughing, worse at night. No nasal symptoms. Change of climate did not influence cough. Severe asthmatic attacks, worse recently.

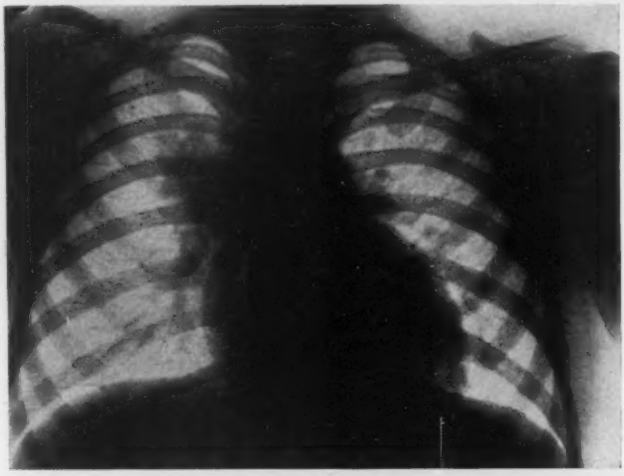

Fig. 4 (Case 2, Feb. 21, 1930). Acute inflammatory infiltration, right peribronchial region.

*Examination:* Bronchiectasis with dried crust secretion on tracheal and bronchial walls and carina. This was removed with bronchoscope aspiration. Nose shows no evident pathology, turbinates normal, septum straight, no pus or polyps. X-ray of sinuses shows antrums, ethmoids and frontals large and cloudy. Bilateral Caldwell-Luc shows antrums filled with polyps and hyperplastic mucosa. Following this operation cough immediately subsided and has had no appreciable cough and no asthma since operation, May, 1929.

M. O., age 7½ years. Cough of two months duration following severe cold in head 2½ months before. Some indefinite history of colds for six months before. One year ago had pertussis, and some

cough for several months after this subsided. Large quantities of sputum and postnasal discharge.

*Examination:* Bilateral purulent ethmoid sinus infection. Pus coming down in olfactory fissure. X-ray of chest shows dense shadow, right hilus lung, and cloudiness of ethmoid and antrums. Following a short course of treatment of nose alone, cough subsided and lung markings have nearly disappeared.

*Comment:* These two cases may both represent an allergic sinusitis, at least in the first one this seems probable. The improvement

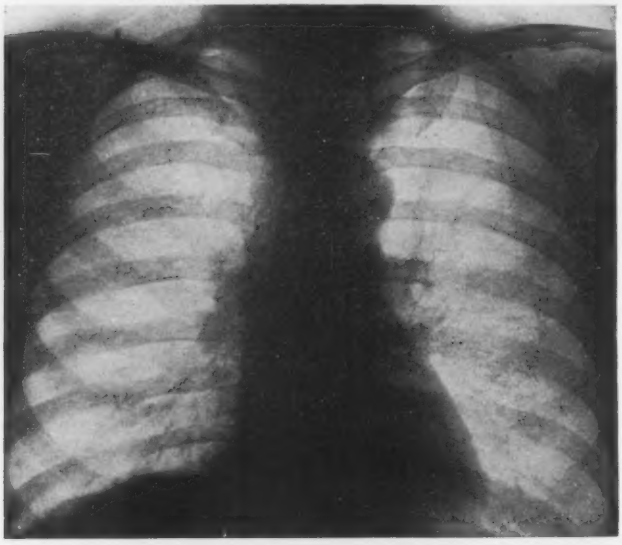

Fig. 5 (Case 2, M. O., March 21, 1930). Numerous small peribronchial calcifications with peribronchial fibroses extending along vertebral and first interspace trunks.

in the first case may only be temporary but, lasting a year, it has been worth while. The explanation of the improvement might be explained on the assumption that the pathology in the sinus after being established reduces the defense mechanism to the irritants, whether cold or allergen, or it lowers resistance to focal infections with deficient ventilation and drainage of the sinuses. Although sinus treatment did not cure these patients, it was a therapeutic relief and was at least temporarily a valuable therapeutic measure.

These cases should not be operated recklessly, but if seen in conjunction with the allergist, many of them can be improved, even though radical surgery of the sinuses is called for. The mode of action of the sinus pathology in its influence on the cough can only be a conjecture. It may act through lymphatics, by direct extension, aspiration of secretion, or be reflex in action. It is most probable that in cases of asthma and allergic phenomena, the pathologic changes in the sinus interfere with the normal defense mechanism, upsetting the balanced allergic state and aggravating the symptoms.

Fig. 6 (Case 1, F. M. J.). Fibrous tissue proliferation. Edema. Round cell infiltration. Degenerating epithelium.

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Associates Building.

## International Digest of Current Otolaryngology.



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Ferreri, in Il Valsalva, No. 2, 1930, describes two rare cases of hereditary luetic tracheobronchial stenosis in young women. The diagnosis was confirmed by the bronchoscope. Energetic specific treatment has given the best results. Lasagna.

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Esch, in the Zeitsch. fur. H., N., u. O., 25:364, 1930, discusses chronic maxillary sinusitis in children. The chief complaint is the chronic sniffling. There is no picture of severe illness; during an acute exacerbation a suppuration occurs which may lead to complications, and it in turn may necessitate surgical intervention. When one opens the antrum there is usually found polyps, thick mucous membranes, with old, dry pus. Kelemen.

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Hofer, in the Monatsch. fur Ohrenheilkunde, December, 1929, discusses the sensory innervation of the larynx. He bases his article on experimental work in eight patients and on previous literature. In his patients, Hofer was able to exclude definite areas by ruling out certain parts of the nerves. His diagrams very lucidly explain which areas were involved. From his studies he states that the superior laryngeal nerve is sensory from the entrance of the pharynx to the lower part of the cords; however, its branches are mixed. Thus Hofer concludes that all four branches of the vagus nerves enclose the larynx in a sensory network.

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Fabroni, in Il Valsalva, No. 1, 1930, reports on the possibility of influencing gastric secretions by smelling odors of nonedible substance. His work does not definitely prove the possibility or impossibility of provoking gastric secretion by such excitement.

Lasagna.

Loebell, in the Zeitsch. fur H., N. u. O., 25:306, 1930, discussed perforation of the septum in abusive uses of cocain. He experimented on rabbits and dogs and found that cocain, either in solution or in powder form, when brought in contact with the septum, could be absorbed and found in the brain, spleen and liver. He observed that the excessive use of cocain destroyed the perichondrium and cartilage of the septum. He believes that it is not the direct action of the cocain on the mucous membrane that produces the damage, but the cocain action on the nerve-ends of the trigeminal nerve sufficiently lowers the resistance of the parts so that any trauma of an already diseased mucous membrane will result in a septum perforation. KELEMEN.

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Poppi, in Il Valsalva, No. 3, 1930, writes on the possible connection between adenoid tissue and the pituitary gland. A supposed delay of union between the two lobes of the pituitary gland, owing to the retarded closure of the cranial pharyngeal canal, would be called upon to explain the doubtful etiology of some lymphoid dyscrasias. LASAGNA.

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The sum of $500.00 having accrued from the Casselberry Fund for encouraging advancement in the art and science of laryngology and rhinology, said sum is now available, in part or as a whole for a prize award, decoration or the expense for original investigation and research in the domains mentioned above. Theses or reports of work must be in the hands of the Secretary, Dr. George M. Coates, 1721 Pine street, Philadelphia, before Feb. 1 of any given year.

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Bunch and Grove, in *The Annals of Otology, Rhinology and Laryngology*, March, 1930, present a very interesting paper on Some Effects in Later Life of Otitis Media in Infancy. They examined a large group of patients and came to the conclusion that factors other than otorrhea alone must play an important part in the pneumatization of the mastoid and in the loss of acuity where deafness exists. They cite numerous cases to show that a severe otitis media in infancy does not necessarily result in the arrest of the pneumatization of the mastoid. X-rays of mastoids can be interpreted only in conjunction with clinical evidence as an intensive pneumatization may be present after an otitis media of five years' duration, while on the other hand, dense sclerosis may be present after one of but four months' duration. The article contains numerous X-ray plates and hearing grafs to substantiate their conclusions.

The Budapester Heilpadagoischen und Psychologischen Laboratoriums recently celebrated its twenty-fifth anniversary, and a special book was published under the direction of Professor Ranshburg. Many interesting articles appeared in this volume, among which was one by Philip Michels concerning the relative standing of the education of the deaf child. The conclusion is reached that the education of the deaf and dumb child is still far behind that of the blind. Michels accounts for this by the fact that the deaf and dumb child must first of all be made to understand the spoken word, and then comes the added difficulty of making him reproduce that sound.

Another interesting article in the same volume is one by Josef Vertes on "The Memory of Deaf and Dumb Children." He experimented with 69 school children and found that the deaf and dumb child has not as good a memory for figures and foreign words as the normal child. The handicapped child can more readily point out indicated words on the blackboard than the normal child. Memory for objects seems to be about the same in both groups. KELEMEN.

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The Fifty-Second Annual Congress of the American Laryngological Association was held May 22-24, 1930, at Swampscott, Mass., under the presidency of Dr. L. A. Coffin. The following officers were elected for the ensuing year:

President—Dr. Francis R. Packard, Philadelphia.

First Vice-President—Dr. Harris P. Mosher, Boston.

Second Vice-President—Dr. James A. Babbitt, Philadelphia.

Secretary—Dr. George M. Coates, Philadelphia.

Treasurer, Dr. George Fetterolf, Philadelphia.

Librarian—Dr. John F. Barnhill, Indianapolis, Ind.

Members of the Council — Dr. Chevalier Jackson, Philadelphia; Dr. D. Bryson Delavan, New York; Dr. Lewis A. Coffin, New York; Dr. Herbert S. Birkett, Montreal, Canada.

Dr. Francis P. Emerson and Mr. Victor E. Negus, of London, were elected Corresponding Fellows, and Dr. Robert F. Ridpath, of Philadelphia, was elected an Active Fellow.

Dr. Charles J. Imperatori was re-elected Abstract Editor.

During the year, the resignations of Dr. Otto J. Stein and Dr. D. J. G. Wishart were accepted with regret.

At the second meeting of the Council, the following Candidates Nominating Committee was elected: Dr. Robert C. Lynch, Dr. Frank R. Spencer and Dr. Harris P. Mosher, Chairman.

An electro-cardiograph, a device for observing and recording contraction of heart muscles, was exhibited publicly for the first time before the annual meeting of the American Medical Association in Detroit, June 23-27, 1930.

The electro-cardiograph was placed on a table and a spectator was selected as a "patient". Curved metal plates were fastened on the inside of each arm and on one leg.

A nurse "tuned in" on the dial. Immediately a tiny spot of light moved back and forth under a glass very much like that of a kodak image finder. At the same time, a permanent record of the "patient's" heart action was recorded on a photographic film.

The electro-cardiograph was carried from the Newark works of the Westinghouse Electric and Manufacturing Company, where it was constructed, to Detroit just as a traveler carries a suitcase.

186471. The electro-cardiograph in actual use.

It can be easily taken to the patient wherever he may be; it requires no outside source of power. It permits examination of a patient's heart when his condition is too serious to move him to the hospital where an electro-cardiograph is part of the permanent equipment.

It permits examination of heart action as part of a physician's regular diagnosis, whether or not heart disease is the major trouble. In this way, it is probable that the hearts of many more persons will be examined. Records of their heart action at various times can be kept and compared.

This portable electro-cardiograph was developed by the engineering and medical departments of the Westinghouse Electric and Manufacturing Company under the guidance of Dr. A. P. D'Zmura, of the University of Pittsburgh School of Medicine.

The original idea of this portable electro-cardiograph was conceived by the late J. W. Legg, engineer of the Westinghouse Electric and Manufacturing Company.

The untimely death of Mr. Legg made it necessary for his associates—Clare Anderson, H. T. Rights and R. H. Lewis, working in close co-operation with the medical department—to carry on the work which he commenced in 1926.

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E. Watson-Williams, in *The Lancet,* April 12, 1930, reports seven cases of parapharyngeal abscess which closely resembled peritonsillar abscess. The most striking difference is the absence of any form of edema of the palatal mucosa. The condition should be suspected when a "quinzy" appears to run an atypical course, or when incision in the usual site upon the tonsil fails to locate pus. The abscess tends to point low in the side of the pharynx behind the posterior faucial pillar where it is permissible to open it under gentle pressure with a blunt instrument.

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Jefferson Medical College announces the following appointments: Dr. Joseph Clarence Keeler, Professor of Otology, to fill the vacancy caused by the death of Dr. S. MacCuen Smith; Dr. Louis H. Clerf, Professor of Bronchoscopy and Esophagoscopy, to fill the vacancy caused by the resignation of Dr. Chevalier Jackson.

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On June 6, the eye, ear, nose and throat specialists of Saginaw Valley organized at the Hotel Bancroft in Saginaw, the Saginaw Valley Academy of Ophthalmology and Otolaryngology. The following officers were elected:

President—Dr. Fred J. Cady, Saginaw.

Vice-President—Dr. P. R. Urmston, Bay City.

Secretary-Treasurer—Dr. Walter K. Slack, Saginaw.

The society will meet on the first Friday of each month, with the exception of during July and August. Dr. Charles Baker, of Bay City presented the first paper on deafness.